ADULT TOBACCO SURVEILLANCE REPORT
PENNSYLVANIA 2013

by

Timothy Brandon

BS, Ursinus College, 2010

Submitted to the Graduate Faculty of

Graduate School of Public Health in partial fulfillment

of the requirements for the degree of

Master of Public Health

University of Pittsburgh

2014

UNIVERSITY OF PITTSBURGH

GRADUATE SCHOOL OF PUBLIC HEALTH

This essay is submitted

by

Timothy Brandon

on

December 9, 2014

and approved by

Essay Advisor:
Yona Keich Cloonan, PhD _____
Assistant Professor of Epidemiology
Graduate School of Public Health
University of Pittsburgh

Essay Reader:
Ravi Sharma, PhD _____
Assistant Professor of Behavioral and Community Health Sciences
Graduate School of Public Health
University of Pittsburgh

Essay Reader:
Nancy W. Glynn, PhD _____
Assistant Professor of Epidemiology
Graduate School of Public Health
University of Pittsburgh

ADULT TOBACCO SURVEILLANCE REPORT, PENNSYLVANIA 2013

Timothy Brandon, MPH

University of Pittsburgh, 2014

ABSTRACT

Public Health Relevance: Tobacco is associated with many of the leading causes of death in the United States. The public health and financial burdens associated with tobacco use are substantial and, unfortunately, do not merely end at the user—secondhand smoke from people using combustible forms of tobacco subject those in their surroundings to increased health risks. Active and passive users contribute to tobacco being the leading cause of preventable, premature death.

Reporting Period: Survey interviews were conducted from January 1-June 30, 2013.

Description of System: The Pennsylvania Adult Tobacco Survey (PA ATS) is a state-administered, random-digit dial survey of non-institutionalized adults, aged 18 and over implemented when funding is available.

Objective: This report aims to detail the current prevalence of different forms of tobacco use and the attitudes/opinions surrounding the subject as determined by the 2013 PA ATS. Additionally, this survey will be used to evaluate progress on reaching tobacco use Healthy People 2020 (HP2020) objectives.

Results: More than one in five (22.8%; 95% CI, 21.0%-24.6%) Pennsylvanians are current smokers, however 68.5% (95% CI, 64.1%-72.9%) are interested in quitting for good. Use of any form of tobacco was highest in the following demographics: males (38.4%; 95% CI, 35.3%-41.5%); 18-24 year olds (43.5%; 95% CI, 36.1%-51.0%); less than a high school degree (44.6%; 95% CI, 38.3%-50.9%); household income <$20,000 (45.4%; 95% CI, 39.3%-51.4%); and live in Philadelphia County (41.9%; 95% CI, 35.2%-48.7%). PA is well short (cigarette smoking prevalence is double the objective, 23%

versus 10%) of meeting the HP2020 goals for tobacco after over a third of the ten year objective period has passed.

Public Health Action: More frequent surveillance focused on tobacco use and attitudes will generate reliable statistics and put pressure on policymakers to deliver results. If the state invests the funds recommended by the CDC in tobacco control and surveillance, they would make progress toward reaching the goals set out in HP2020. When dealing with the number one preventable cause of premature death, the costs of surveillance and effective control measures will be returned many times over in the long run with a healthier, productive population.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

PREFACE

Special thanks to the following individuals for helping make this report possible:

Yona Keich Cloonan, PhD, Assistant Professor of Epidemiology, Graduate School of Public Health, University of Pittsburgh

Ravi Sharma, PhD, Assistant Professor of Behavioral and Community Health Sciences, Graduate School of Public Health, University of Pittsburgh

Nancy Glynn, PhD, Assistant Professor of Epidemiology, Graduate School of Public Health, University of Pittsburgh

Barbara Caboot, Chief, Division of Tobacco Prevention and Control, PA DOH

Michael Tarkoff, Division of Statistical Support, PA DOH

Judy Ochs, Director, Division of Tobacco Prevention and Control, PA DOH

Steve Muccioli, Division of Statistical Support, PA DOH

Micah Victoria, Division of Statistical Support, PA DOH

Ralph Beishline, Division of Statistical Support, PA DOH

DISCLAIMER

The statistics found in this report are unofficial and do not represent analyses, interpretations, or conclusions of the Pennsylvania Department of Health (DOH) or the Centers for Disease Control and Prevention (CDC).

1.0 INTRODUCTION

1.1 TOBACCO-RELATED BURDENS

Tobacco use in the United States contributes to the highest percentage of preventable causes of premature death, ahead of obesity and physical inactivity.[1, 2, 3] Consumption of tobacco, whether in combustible or smokeless form, increases the risk of developing health problems such as cancers, respiratory and cardiovascular diseases, and metabolic conditions.[1, 4, 5, 6] Current users of different tobacco products, when compared to non-users, have increased risk of morbidity and mortality: current cigarette smoking was associated with an increased risk of all-cause mortality between 1.8 and 3.0 times; cigar smoking raised the risk for several cancers between 4 and 10.3 times; smokeless tobacco use increased risk of all-cause mortality 1.2 times for men and 1.3 times for women; regular pipe smoking increased all-cause mortality 1.3 times; and water pipe smoking (hookah) increased risk of lung cancer 2.1 times. [1, 6, 7, 8, 9, 10] As compared with non-smokers, smokers have a 10 year shorter life expectancy.[11] In Pennsylvania (PA), about 22,000 adults die annually due to smoking-attributable deaths.[12] Of the youth aged 0-17 years currently living in PA, a projected 243,700 will die from smoking-related illness.[12]

One of the major problems with tobacco use is that when it is smoked, the detrimental health effects do not end with the user. Secondhand tobacco smoke exposure, commonly termed passive smoking or environmental tobacco smoke, carries similar health risks to individuals who actively smoke.[1, 13, 14] The effects of secondhand smoke on the cardiovascular system, such as inflammation, increased insulin resistance, and increased oxidative stress, are 80-90% similar to active smoking, and the Centers

for Disease Control and Prevention (CDC) estimates that close to 42,000 deaths occur in adults annually in the United States as a result.[1, 13, 14]

These health problems are not experienced equally across the population. Differences exist for the lowest socioeconomic classes, racial/ethnic minorities, and lowest levels of educational attainment in terms of tobacco use, associated health outcomes, and the offering of intervention services by healthcare professionals.[15, 16, 17, 18, 19] These groups carry an unequal share of the burden and have the greatest potential for improvement when using culturally sensitive and socioeconomically appropriate targeted prevention and cessation programs.[19]

Tobacco use is not just a burden on the health of Pennsylvanians but also has serious pecuniary side-effects. The estimated annual health care costs for PA alone that are directly due to smoking are $6.38 billion.[20] Of this, $1.7 billion is covered by the state Medicaid program.[20, 21] Moreover, tax payers contribute $669 per household annually for state and federal taxes used to pay for government smoking-related expenditures.[20] These amounts are underestimates of the true burden because they do not account for health costs associated with secondhand smoke exposure and other tobacco products. Nationwide, an estimated 600,000 years of potential life are lost due to deaths from secondhand smoke exposure, resulting in an approximate loss in productivity of $6.6 billion.[14] This translates to about $158,000 per death.[14]

However, smoking cessation before age 40 reduces the risk of smoking-related mortality by 90%.[11] While the greatest health benefits are seen in those quitting earlier, increases in life span are seen across all ages.[11, 25] Male smokers quitting at age 65 could expect to gain 2.0 years of additional life expectancy, and women could gain 3.7 years when compared to 65-year-olds who continue to smoke.[22] Evidence shows that tobacco cessation not only extends life expectancy, but also improves quality of life.[23, 24, 25] Health-related quality of life indicators were worst among current smokers who have experienced failed quit attempts, followed by current smokers not trying to quit, and are highest for former smokers.[23] Not surprisingly, those who smoked for the longest durations reported the largest

improvement in quality of life, with the most noticeable increases coming as a result of a declining range of respiratory symptoms.[24, 25] Taking into account the morbidity/mortality and monetary burdens culminating as a direct result of tobacco use, there is significant opportunity and a great need to intervene.

1.2 IMPORTANCE OF TOBACCO SURVEILLANCE

The United States, through Healthy People 2020 (HP2020) launched in December 2010, has set numerous target health goals to be achieved by 2020, including objectives regarding tobacco use.[26] These goals aim to improve public health and reduce the prevalence of disease across the country. The tobacco-related objectives for HP2020 relevant to the information gathered in the 2013 PA Adult Tobacco Survey (ATS) are to reduce the percentage of current adult cigarette smokers to 12%, current adult cigar smokers to 0.2%, current smokeless tobacco users to 2%, and to increase the number of adult smokers who have attempted to quit smoking to 80%.[27] These data for HP2020 are collected in the National Health Interview Survey (NHIS), conducted by the National Center for Health Statistics (NCHS) within the CDC. Intermittent surveying prior to the end of the objective period provides information on progress toward meeting these specific goals.

Tobacco surveillance is central to PA meeting its commitment to reducing tobacco-associated mortality. Results serve to identify where improvement in public health practice is possible and as evidence for or against current program effectiveness. The PA ATS is a health department tool for collecting, analyzing, interpreting, and disseminating tobacco-related statistics. Specifically, the PA Department of Health uses information collected during tobacco surveillance to evaluate its progress on four goals: (1) preventing young people from using tobacco, (2) promoting cessation among tobacco users, (3) eliminating nonsmokers' exposure to secondhand smoke, and (4) identifying and removing tobacco-related disparities.[12, 28]

While national surveys capture a descriptive snapshot for each state, surveys like the PA ATS conducted by states provide flexibility to perform region-specific evaluations, such as county-level or county cluster analyses. Additionally, states have the opportunity to add items to the core questionnaire to gauge public opinion about recently implemented policy (e.g. Clean Indoor Air Act, Act 27 of 2008) or on new policies being considered for implementation, such as a tax on smokeless tobacco.

With so much money going toward prevention and control, the public should be kept abreast on the types of returns they are receiving for their investments. Surveillance provides periodic status reports on these investments. Information from surveillance reports inform policy, shape budgets, and justify grant applications. Without statistical evidence like the data collected from the PA ATS demonstrating the need for public health intervention, funding is typically diverted elsewhere.

1.3 PUBLIC HEALTH SIGNIFICANCE OF TOBACCO SURVEILLANCE

Tobacco use is a risk factor for many of the leading causes of death in the United States. It is a significant public health burden, taking a substantial toll on the health and wealth of the population. This burden is not only carried by tobacco users, but is shared with those in their vicinity through secondhand smoke. Surveillance is necessary to measure this burden and evaluate how it can be reduced through changes in policy. Surveys, such as the ATS, identify populations at a particular point in time where primary or secondary prevention can still save lives, improve the quality of lives, and save money.

1.4 OBJECTIVES

Using data collected during the 2013 PA ATS, the primary aim of this report is to describe the 2013 tobacco environment pertaining to use, attitudes, healthcare, and quitting behaviors in PA. A secondary

aim is to evaluate the state's progress on meeting the Tobacco Use (TU) objectives defined in HP2020: (1) TU-1.1 Reduce cigarette smoking by adults, (2) TU-1.2 Reduce use of smokeless tobacco products by adults, (3) TU-1.3 Reduce use of cigars by adults, and (4) Increase smoking cessation attempts by adult smokers.[27]

2.0 METHODS

2.1 HISTORY/BACKGROUND OF ADULT TOBACCO SURVEY

The ATS is a stratified random-digit dial telephone survey developed by the CDC to evaluate state programs using a tool to provide comparability between states. It is a state-administered survey of non-institutionalized adults aged 18 and over. Initiated in 1986, the survey is conducted at state discretion dependent upon funding and needs of each state. PA last conducted the survey in 2005.

A National Adult Tobacco Survey (NATS), also developed by the CDC, was created to provide a measure of how tobacco control programs were functioning on a national level. The NATS was initiated in 2009 and is conducted annually dependent upon funding. The most recent survey data available are from the 2012-2013 NATS. NATS data are published in online reports from the CDC.

2.2 GOALS OF THE SURVEY

The goals of the PA ATS are to collect data on tobacco use, quitting behaviors, and knowledge and attitudes about tobacco as well as second hand smoke. With this data, health departments can assess program effectiveness using short, intermediate, and long-term indicators. These indicators are specific and measurable characteristics, such as changes in the prevalence of current smokers or a shift in the percentage of people who believe secondhand smoke is harmful.

Statewide surveillance is conducted to gather data on the behaviors, attitudes, and knowledge surrounding tobacco usage, risks and social influences surrounding tobacco, smoking cessation, prevalence of secondhand smoke exposure, health influences, and tobacco-related policy issues in Pennsylvania.

2.3 SAMPLE DESIGN

Survey respondents were selected from two sampling frames, one of landline telephones and one of cellular telephones. Even though landline and cellular phones were sampled, each household had the potential to be selected only once because the eligibility for cell phone inclusion in the sample was restricted to cell phone-only households. Cell phones were selected as a simple random sample and landlines were stratified into three regions: Philadelphia County, Allegheny County, and the rest of the state. A commercial contract company was used to generate an efficient list of likely active telephone numbers. All telephone interviews were conducted by Clearwater Research, Inc. using a computer-assisted telephone interviewing (CATI) survey program, and were carried out in 2013 between January 1 and June 30. A total of 4,434 responses were collected from an eligible 10,898 numbers dialed, with an overall survey response rate of 41%.

2.4 WEIGHTING METHODOLOGY

The data was weighted to account for unequal probabilities of selection. Behavioral Risk Factor Surveillance System (BRFSS) weighting methodology was employed for this survey.[29] To calculate stratum weight, the inverse of the sampling fraction was calculated as the number of records in the stratum divided by the number of records selected. To obtain the final weight, the stratum weight was

multiplied by the number of adults in the household divided by the number of residential household telephone numbers within the respondent's household.

2.5 SURVEY NONRESPONSE ADJUSTMENT

An iterative proportional fitting, or raking, weighting scheme was employed to adjust for survey nonresponse. After adjusting for probability of selection, missing values were imputed for age, race, sex, and region. These imputed values were only used during the weighting process and were treated as missing values during the analysis. Age was imputed using race and sex. Responses missing just an age value were given the average age of the present race and sex values. If age and sex were missing, the missing age value was set as the average age of the given race. When age and race were missing, the missing age value took on the value of the mean for the sex. If all three variables were missing, the mean age of the entire sample was applied. Values missing for sex were then set to female following recommendations in the Research Triangle Institute (RTI) guidelines.[30] Race values that were missing were set to 'white.' Missing regional values were set to 'Philadelphia.' Pennsylvania population statistics were obtained from a combination of U.S. census data and BRFSS estimates for each of four margins: age/sex, race, region, and telephone type. The iterative process proceeded from margin to margin multiplying by a value necessary to reach the target for each specific margin. This was repeated until the set convergence criteria, less than 1%, was reached for all values. Three iterations were completed and the largest difference between the target and final weight was 0.058% across all margins. This methodology differs from the nonresponse adjustment from the CDC in that the landlines were raked to an additional margin according to metropolitan status code.[30] These metropolitan codes were not available for this project so the CDC method was adapted due to time constraints.

2.6 DEFINITIONS

This report describes use of different tobacco products by adults across many demographic categories and the criteria for those definitions can be found below.

Respondents were asked if they have ever smoked 100 cigarettes in their lifetime. If they answered 'yes,' the follow-up question was if they now smoked every day, some days, or not at all. Current cigarette smokers were those who reported smoking 100 cigarettes in their lifetime and smoking either every day or some days. Former cigarette smokers were those who reported smoking 100 cigarettes in their lifetime but did not smoke at all at the time of the survey. Never cigarette smokers had not smoked 100 cigarettes in their lifetime.

Respondents were grouped demographically into categories for region, age, race/ethnicity, education level, annual household income, and marital status. Region in this report refers to health district. PA is separated into six health districts, which are organized regionally into clusters of 8-13 counties each. In this survey, Philadelphia and Allegheny counties are separated from their geographic districts to provide a total of 8 distinct regions. Respondent ages were grouped into six categories: 18-24, 25-34, 35-44, 45-54, 55-64, and 65+ years. Survey participants were grouped into four race/ethnicity categories: white, non-Hispanic; black, non-Hispanic; Hispanic; and other. Education level was grouped into four categories: less than a high school degree, high school degree or General Education Development (GED), some college level education, and bachelor's degree or higher. Annual household income was divided into seven categories: <$20,000, $20,000-$29,999, $30,000-$49,999, $50,000-$69,999, $70,000-$99,999, $100,000-$149,000, and $150,000+. Lastly, survey respondents could select from six marital statuses: married, divorced, widowed, single, living with a partner, or separated.

Non-cigarette tobacco products were asked about during survey interviews. Current users were those who reported ever trying the product and also using the product in the 30 days preceding the survey interview. These products were smokeless tobacco, snus, electronic cigarettes, cigars, regular pipes, and

water pipes/hookahs. Smokeless tobacco in the ATS referred to chewing tobacco, snuff, and dip. Snus, the Swedish word for snuff, is a form of smokeless tobacco that comes packaged in a small pouch that is placed against one's gums under the lip. Electronic cigarettes (e-cigarettes), while not actually a tobacco product, were included in the questionnaire to measure the prevalence within the state, as well as how many people use them as a substitute for regular cigarettes in places where cigarette smoking is prohibited. Cigars in the ATS referred to cigars, cigarillos (a small, narrow cigar larger than a cigarette), or very small cigars that look like cigarettes. Regular pipes and water pipes/hookahs do not cover any additional products under those names.

2.7 ANALYSIS

SAS version 9.3 was used to calculate weighted frequencies for the survey data. Cigarette use was shown overall, as well as stratified by region, age group, sex, race/ethnicity, education, income, and marital status. Non-cigarette product use was also examined overall, and stratified by sex and smoking status. Reliability estimates were calculated for each statistic by comparing a complex survey design to a simple random sample of size 50. Statistics found to be unreliable have notation designating them as 'not statistically reliable.'

3.0 RESULTS

3.1 CIGARETTE SMOKING

In PA, 60% of the adult population has ever smoked cigarettes. Over one in five Pennsylvanians [22.8% (95% CI, 21.0%-24.6%)] were current smokers, 40.0% (95% CI, 37.8%-42.1%) were never smokers, and the remaining 37.2% (95% CI, 35.2%-39.2%) were former smokers (Figure 1).

The distribution of current cigarette smokers differs demographically by region, age group, sex, race/ethnicity, education, income, and marital status. Prevalence for these population subgroups follow.

Region. Figure 2 details the prevalence of current cigarette smokers by region. PA's Northwest region reported the highest percentage of current smokers [30.5% (95% CI, 23.7%-37.2%)], while Allegheny had the lowest [18.8% (95% CI, 13.8%-23.9%)]. Allegheny's within-state peer county, Philadelphia County, was much higher with a prevalence of 29.1% (95% CI, 22.8%-35.4%). Philadelphia's surrounding region, the Southeast, had a prevalence of 19.7% (95% CI, 16.1%-23.3%).

Age. The highest percentage of current smokers was 25-34 year olds with 33.8% (95% CI, 28.1%-39.5%). The age group of 65+ had the lowest prevalence of current smokers [10.7% (95% CI, 8.6%-12.8%)]. The remaining age categories had a current smoking prevalence between 21.0% and 26.3%. (Figure 3).

Sex. A difference existed between males and females, with 26.5% (95% CI, 23.6%-29.4%) of males and 19.2% (95% CI, 16.9%-21.4%) of females reporting current smoking (Figure 4). Stratifying current male and female smokers by age showed that males had more prevalent smoking at every age

group except 35-44, where female smokers [9.1% (95% CI, 6.6%-11.5%)] and male smokers [8.6% (95% CI, 5.8%-11.4%)] were equivalent. The largest disparity between sexes was observed in the 25-34 age group, where male smokers [16.0% (95% CI, 12.1%-20.0%)] almost doubled the prevalence of female smokers [8.6% (95% CI, 5.9%-11.2%)] (Figure 5).

Race/Ethnicity. White, non-Hispanics had a current smoking prevalence of 21.1% (95% CI, 19.2%-23.0%). The percentage for black, non-Hispanics was 31.8% (95% CI, 24.7%-38.8%) and the lowest percentage was seen in those of 'other' race [19.5% (95% CI, 11.2%-27.9%)]. The estimate for Hispanics was not statistically reliable due to small sample sizes (Figure 6).

Education. Education analysis was restricted to adults 25 and older to avoid misclassifying respondents who were too young to reach the highest possible education level at the time of surveying. Amount of education completed had an inverse relationship with percentage of current smokers. Individuals with less than a high school degree had the highest prevalence of current smokers [38.7% (95% CI, 32.5%-45.0%)], while respondents with a bachelor's degree or higher had the lowest prevalence [10.3% (95% CI, 8%-12.7%)] (Figure 7).

Household Income. An inverse relationship between income and percentage of current smokers was observed. The highest income category ($150,000+) had a current smoking prevalence of 9.5% (95% CI, 5.8%-13.3%), and the lowest income category (<$20,000) had the highest prevalence [39.1% (95% CI, 33.0%-45.1%)] (Figure 8).

Marital Status. Those living with a partner had the highest percentage of current smokers [41.2% (95% CI, 33.7%-48.6%)], followed by divorcees [35.6% (95% CI, 29.8%-41.5%)]. Married individuals [14.5% (95% CI, 12.4%-16.6%)] and widowed respondents [14.2% (95% CI, 9.9%-18.5%)] reported the lowest prevalence of current smokers. The prevalence for individuals with a marital status of separated was not statistically reliable due to small sample sizes (Figure 9).

3.2 OTHER TOBACCO PRODUCT USE

Table 1 and 2, along with Figure 10, detail the prevalence of current use by Pennsylvanians of non-cigarette tobacco products.

Smokeless Tobacco. In 2013, 3.4% (95% CI, 2.6%-4.3%) of respondents reported current smokeless tobacco use. The percentage of all adults who have ever tried smokeless tobacco was 19.9% (95% CI, 18.2%-21.7%). Individuals reporting ever trying smokeless tobacco were predominately male, with 35.7% (95% CI, 33.1%-38.3%) having tried smokeless tobacco compared to 3.2% (95% CI, 2.4%-4.0%) of females. Of current smokers, 34.2% (95% CI, 29.8%-38.7%) have tried smokeless tobacco.

Snus. Snus was the least popular non-cigarette tobacco product asked about in the survey with only 0.6% (95% CI, 0.2-1.0) of adults reporting current use. Very few adults have even ever tried snus [6.2% (95% CI, 5.1%-7.4%)]. Again, a higher percentage of men [9.8% (95% CI, 8.1%-11.5%)] had tried snus compared to women [1.1% (95% CI, 0.6%-1.7%)]. Younger age groups were more likely to try snus with 10.5% (95% CI, 6.8%-14.1%) of 18-24 year olds, and 10.8% (95% CI, 7.5%-14.0%) of 25-34 year olds reporting having ever tried it. The lowest prevalence of ever trying snus was in the 65+ age group [1.0% (95% CI, 0.4%-1.6%)]. Stratified by smoking status, current smokers had most often tried snus in the past [15.6% (95% CI, 11.9%-19.3%)].

Electronic cigarettes. The survey found 6.1% (95% CI, 5.0%-7.3%) of adults could be classified as current e-cigarette smokers and 16.6% (95% CI, 14.9%-18.4%) of adults have tried e-cigarettes. Males were more likely to report having tried e-cigarettes [16.1% (95% CI, 13.9%-18.2%)] than females [10.9% (95% CI, 9.2%-12.5%)]. Current smokers have tried e-cigarettes [51.9% (95% CI, 47.3%-56.5%)] much more than never smokers [1.6% (95% CI, 0.4%-2.8%)] and former smokers [11.2% (95% CI, 8.8%-13.5%)]. E-cigarettes were smoked as a substitute in situations where other tobacco products were not permitted because of location restrictions by 34.2% (95% CI, 28.6%-39.8%) of adults who tried e-cigarettes.

Cigars. Smoking cigars was the most preferred form of other tobacco use: 5.2% (95% CI, 4.1%-6.4%) of adults reporting current use and 40.6% (95% CI, 38.5%-42.8%) of adults having tried them. A substantial difference existed in the prevalence of ever trying cigars by sex, with 60.8% (95% CI, 58.0%-63.5%) of males and 21.4% (95% CI, 19.4%-23.4%) of females reporting ever trying them. Current and former smokers were about equally likely to report trying smoking cigars with percentages of 62.9% (95% CI, 58.5%-67.3%) and 58.8% (95% CI, 55.6%-61.9%) respectively.

Regular Pipe. The percentage of all adults who have ever tried smoking from a regular pipe was 18.8% (95% CI, 17.2%-20.4%), with 1.0% (95% CI, 0.5%-1.5%) reporting current use. Males [1.5% (95% CI, 0.7%-2.2%)] were more often current smokers of a regular pipe than were females [0.1% (95% CI, 0.0%-0.1%)]. Males were also far more likely to have ever tried smoking from a regular pipe as compared with females [31.1% (95% CI, 28.6%-33.5%) versus 4.0% (95% CI, 3.1%-4.9%), respectively]. Pipe smoking percentages were much higher among older age groups with the two highest percentages seen in 65+ year olds [6.9% (95% CI, 24.2%-29.5%)] and 55-64 year olds [26.4% (95% CI, 23.1%-29.8%)]. The 18-24 year old group had a percentage of 9.7% (95% CI, 6.3%-13.2%). Former smokers had the highest prevalence of ever trying smoking from a regular pipe [30.1% (95% CI, 27.2%-33.1%)], followed closely by current smokers [28.2% (95% CI, 24.0%-32.4%)], and never smokers [2.8% (95% CI, 1.8%-3.7%)].

Hookah. Hookah, or other water pipe smoking, current use was low [1.2% (95% CI, 0.7%-1.7%)]. Trying hookah, even one or two puffs, was reported by 10.4% (95% CI, 9%-11.8%) of adults, with 14.8% (95% CI, 12.8%-16.9%) of males and 7.5% (95% CI, 5.9%-9%) of females reporting having tried it. This form of tobacco consumption is much more popular in younger age groups than older age groups with the highest percentages of trying smoking from a water pipe or hookah seen in 18-24 year olds [34.0% (95% CI, 27.6%-40.4%)] and 25-34 year olds [21.8% (95% CI, 17.7%-25.9%)], as compared with much lower levels seen in 65+ year olds [2.2% (95% CI, 1.3%-3.1%)] and 55-64 year olds [4.5% (95% CI, 2.9%-6.1%)].

3.3 CESSATION

Survey participants were asked to rate their general health ranging from excellent to poor: 83.5% (95% CI, 82%-85.1%) of respondents consider their health to be good, very good, or excellent. Respondents that were current smokers self-reported their health to be good, very good, or excellent only 76.5% (95% CI, 72.7%-80.3%) of the time and former smokers 81.5% (95% CI, 79.1%-84%) of the time. Never smokers self-reported better general health than former and current smokers with 89.4% (95% CI, 87.2%-91.6%) reporting good, very good, or excellent health (Figure 11).

In the 12 months preceding the survey interview, 84.7% (95% CI, 83.1%-86.4%) of survey respondents had seen a doctor, dentist, nurse, or other health professional. This varied by smoking status with 77.3% (95% CI, 73.2%-81.5%) of current smokers, 90.6% (95% CI, 88.7%-92.5%) of former smokers, and 83.4% (95% CI, 80.5%-86.3%) of never smokers seeking out medical care in the previous year (Figure 12). Current smokers who visited a health professional in the 12 months prior to the survey were advised by the healthcare worker to quit smoking cigarettes or other tobacco product 71.6% (95% CI, 67.0%-76.2%) of the time. Of current, former, and never smokers, former smokers [89.2% (95% CI, 87.0%-91.3%)] most often had health insurance. Current smokers had the lowest prevalence of health insurance coverage [71.1% (95% CI, 66.8%-75.4%)].

The majority of current smokers [68.5% (95% CI, 64.1%-72.9%)] would like to quit smoking cigarettes for good, and 33.0% (95% CI, 25.2%-40.8%) of those who desire to quit plan on quitting in the six months following the survey. Quit attempts were made by 61.6% (95% CI, 57.0%-66.2%) of adults in the 12 months leading up to the survey; this differed little according to sex.

3.4 SECONDHAND SMOKE AND TOBACCO-FREE POLICIES SMOKE

Smoking is not permitted in 79.0% (95% CI, 77.3%-80.7%) of homes, and when asked for an opinion on smoking in the house, 61.2% (95% CI, 59.1%-63.3%) of respondents said smoking should never be allowed and 22.6% (95% CI, 20.8%-24.4%) said smoking restrictions should be up to the people who live there. Married adults had the highest percentage of not permitting smoking in the home as compared with other marital statuses [89.3% (95% CI, 87.8%-90.7%)]. The lowest percentage was seen in divorced adults [71.0% (95% CI, 66.1%-75.8%)]. Workplaces were stricter, not allowing any smoking indoors at 92.3% (95% CI, 90.5%-94.0%) and outdoors at 26.0% (95% CI, 23.4%-28.7%) of survey respondents' workplaces.

The survey interview asked how important it was that all workers be protected from exposure to smoke equally under the law and most adults believed it was very important [62.1% (95% CI, 60.0%-64.2%)]. The Clean Indoor Act, banning smoking in restaurants, has resulted in 19.2% (95% CI, 17.6%-20.9%) of adults going out to eat more and 6.2% (95% CI, 5.2%-7.2%) going out to eat less. For most adults [74.6% (95% CI, 72.7%-76.4%)] the passage of the law did not result in any change of habits related to going out to eat. There was a difference in attitudes between current smokers and never smokers – current smokers reported going out to eat more 4.9% (95% CI, 2.6%-7.1%) of the time and going out less 14.7% (95% CI, 11.7%-17.8%) of the time, as compared to never smokers, who reported going out to eat more 27.1% (95% CI, 24.0%-30.2%) of the time and going out less only 4.3% (95% CI, 2.8%-5.7%) of the time. Former smokers more closely mirrored the statistics for all adults, reporting going out more 19.6% (95% CI, 17.2%-22.1%) of the time and going out less 3.0% (95% CI, 1.9%-4.2%) of the time as a result of the law. Similar trends were seen in attitudes toward fully banning smoking in bars and casinos, which currently have exemptions to the law. Adults reported it would be more likely that they would visit these establishments if smoking was banned, but the responses varied based on smoking status.

Almost all respondents were of the opinion that secondhand smoke is either very harmful or somewhat harmful to one's health [94.3% (95% CI, 93.2%-95.3%)]. A greater percentage of females [98.1% (95% CI, 97.5%-98.6%)] believed breathing smoke from someone else's cigarette or other tobacco product is harmful, as compared with males [92.7% (95% CI, 91.3%-94.2%)]. Current smokers had the lowest percentage of respondents with this belief [86.6% (95% CI, 83.5%-90.0%)] followed by former smokers [95.4% (95% CI, 94.0%-96.7%)] and never smokers [97.6% (95% CI, 96.2%-99%)].

3.5 OPINIONS AND ATTITUDES RELATED TO TOBACCO

Adults favor taxing smokeless tobacco if the money were used to improve public health, with 72.4% (95% CI, 70.4%-74.4%) agreement with this idea. This percentage differed between males [69.3% (95% CI, 66.8%-71.9%)] and females [81.3% (95% CI, 79.4%-83.1%)]. A difference was also noted between smoking status categories—the percentage of current smokers favoring a tax was only 47.9% (95% CI, 43.2%-52.6%), compared with 77.5% (95% CI, 74.7%-80.4%) of former smokers, and 81.9% (95% CI, 79.0%-84.7%) of never smokers (Figure 13).

Prevention of tobacco sales to minors was important to adults, with 84.5% (95% CI, 82.9%-86.1%) of adults reporting it was very important and 10.5% (95% CI, 9.1%-11.8%) reporting it was somewhat important to prevent sales to minors. Males were less likely to say it was very important to prevent tobacco sales to minors [80.4% (95% CI, 78.2%-82.6%)] than females [90.3% (95% CI, 88.8%-91.7%)] (Figure 14).

Survey respondents supported completely banning tobacco on school grounds, including parking lots, and at all school events, even for teachers and adults, with 84.2% (95% CI, 82.5%-85.9%) of adults in agreement. A majority of current smokers supported the ban, but had the lowest percent in agreement

[68.9% (95% CI, 64.4%-73.3%)]. Never smokers had a high percentage of agreement for banning tobacco on school grounds [90.7% (95% CI, 88.3%-93.2%)] (Figure 15).

Parents with children aged 17 years or younger were asked their opinion on the importance of talking to their children about not using tobacco. A majority agreed talking to their offspring was very important or somewhat important to them [55.4% (95% CI, 51.4%-59.4%)]. Only a small amount of fluctuation was observed in response percentages according to smoking status. Current smokers reported the highest percentage of responses of very important or somewhat important [59.1% (95% CI, 51.2%-67.1%)] followed by former smokers [56.9% (95% CI, 50.1%-63.7%)]. Never smokers had the lowest percentage [51.9% (95% CI, 45.7%-58.1%)] (Figure 16).

3.6 HEALTHY PEOPLE 2020

National targets have been set for different health-related topics by the government and are based on baseline data from prior year surveys. The first objective is to reduce current cigarette smoking in adults to 12% as compared with the 2008 baseline level of 20.6% (age-adjusted to year 2000 standard population). In the current report, the current adult cigarette smoking prevalence in PA is 22.8% (95% CI, 21%-24.6%), which is more than 10% above the HP2020 target (Table 3).

The next relevant objective is to reduce current use of smokeless tobacco products among adults to 0.3%, as compared with the 2005 baseline data level of 2.3% (age-adjusted to year 2000 standard population). The prevalence of current adult smokeless tobacco users in PA [3.4% (95% CI, 2.6%-4.3%)] is 3.1% above the HP2020 target. Current smokeless tobacco use was defined differently for HP2020—adults 18 and older who have used smokeless tobacco at least 20 times and now use it every day or some days—than in the 2013 PA ATS. The difference in definitions limits the comparability of the results. Current use in the PA ATS offers a more conservative estimate and is likely to be an overestimation (Table 3).

HP2020 also has an objective for current cigar smoking in adults. The goal is to reduce cigar smoking from the 2005 baseline data [2.2% (age-adjusted to year 2000 standard population)] to 0.2%. PA had a current adult cigar smoking prevalence of 5.2% (95% CI, 4.1%-6.4%), which is 5% above the target. Current cigar smoking was defined differently for HP2020—adults 18 and older who have smoked 50 cigars in their lifetime and now smoke cigars every day or some days—than in the 2013 PA ATS. The difference in definitions limits the comparability of the results. Current use in the PA ATS offers a more conservative estimate and is likely to be an overestimation (Table 3).

The final objective being compared in this report is on cessation. The target is to increase the percentage of adults attempting to quit smoking to 80%, as compared with 2008 baseline levels of 48.3% (age-adjusted to year 2000 standard population). PA had 61.6% (95% CI, 57.0%-66.2%) of adults attempt to quit smoking cigarettes in 2013, 18.4% below the target (Table 3).

4.0 DISCUSSION

Statewide surveillance data provides the benchmarks for program evaluation, disparity assessment, and identifies trends over time. The PA ATS is especially useful because state-specific results can be compared across survey years, with results from other state ATSs, and with the NATS. PA last conducted the ATS in 2005. These past survey results are not included in this report because the CDC sampling methodology for the BRFSS changed in 2011 to incorporate cell phones and it is assumed the ATS underwent the same change, making comparisons unreliable. It is important to update survey questions to reflect changing needs over time, but it is also critical to maintain standardization for the purpose of comparability of different indicators.

Data from the 2013 PA ATS provides insight into where prevention and cessation programs could have the greatest effect, while also measuring the statewide pulse on different legislative issues. About one in five people smoke cigarettes and more than one in four use some type of tobacco product in PA. The highest proportions of current cigarette smokers were seen in men, non-Hispanics, younger adults, the less educated and poorer, and those living in the Northwest regional health district. Young adults were more likely to have tried smoking electronic cigarettes and water pipes/hookahs while older age groups had the highest percentage of trying smoking from a regular pipe. One in five Pennsylvanians go out to restaurants more frequently because of the passage of the Clean Indoor Air Act in 2008, which prohibited smoking indoors unless the facility comes under some exception to the law. About the same number would frequent bars and casinos more often if those venues were not allowed exceptions to the law. The commonwealth's citizens favor a tax on smokeless tobacco if the funds are used for improving public

health and also support completely tobacco-free school grounds. All of this information is invaluable when it comes to determining the future direction of the state.

The NATS, last conducted in 2012-2013, provides perspective on where PA stands nationally regarding tobacco prevalence. PA lagged behind the nation in current use of any tobacco product [27.6% in PA versus 25.2% (95% CI, 24.7%-25.7%) nationally] and current cigarette smoking [22.8% in PA versus 18.0% (95% CI, 17.5%-18.5%) nationally].[31] PA belongs to the Northeast census region, which has the lowest prevalence of current cigarette smoking [16.0% (95% CI, 15.5%-17.9%)] and second lowest prevalence of current use of any tobacco product [23.7% (95% CI, 22.4%-25.1%)].[31] Based on 2012 BRFSS data, it is possible to compare smoking prevalence state-by-state: prevalence of current cigarette smokers ranged from 10.6% (Utah) to 28.3% (Kentucky).[32] PA had the 35th lowest prevalence of current smokers in the United States, but had the highest prevalence of states in the Northeast census region.[32] This wide range suggests there is room for improvement and that the Healthy People 2020 goals are indeed achievable.

PA is not on track to meet the Healthy People 2020 goals. After about a third of the way through the decade-long objective period ending in 2020, PA is behind schedule, at least in terms of tobacco goals which are measurable by the ATS. Comparing 2013 ATS statistics to years 2011 and 2012 BRFSS data (the most valid comparison years due to sampling technique and weighting methodology) shows only a modest improvement, if any, toward the objectives.[45] This can be partly attributed to the state lagging behind national data even at baseline. Yet, even when taking this into consideration, PA has not made much improvement toward the targets. The objectives for cigarette smoking prevalence and percentage of adults with cessation attempts were unmet in Healthy People 2010. As a result, the same goals were retained for HP2020.[27] Cigar smoking and smokeless tobacco use goals were to decrease prevalence by 2% from baseline and PA is not on pace to meet this absolute decline, let alone the actual target value.[27]

Major changes in policy and program implementation are needed for the state to reach any of the designated benchmarks. It may take an unconventional method to break away from the plateau PA has reached. To make progress toward meeting any of the objectives, we must first understand the target

population. Using survey data, we can find out more information about current cigarette smokers to find ways to help them. Almost seven in ten current smokers are interested in quitting and two out of five have made a quit attempt in the past year. These current smokers were least likely to seek out medical care in the 12 months prior to the survey (77%), and it is important to investigate why this is happening. Evidence shows it is not because they think they do not need care, as revealed by current smokers being the least likely (77%) of the smoking statuses to report "good" or better health through self-report. It can partially be explained by health insurance coverage by smoking status: current smokers had the lowest percentage of covered respondents (71% versus 85% for never smokers). Connecting more individuals to the healthcare system to access needed medical attention, advice and resources regarding cigarette smoking, is likely to impact the prevalence of cigarette smoking.

Though controversial, there may be net benefits in the use of electronic cigarettes as a cessation aid. The majority of those who have tried e-cigarettes in the 2013 PA ATS were current smokers. If this population is open to experimenting with this relatively new form of nicotine delivery, it may be possible to permanently switch away from tobacco, with the ultimate goal of complete cessation. This harm reduction tactic must take into account that the health risks associated with e-cigarettes are still largely unknown; yet, they are assumed to be substantially less than those of other tobacco products. Studies on the short-term effects of use are indicative of several negative effects. Use of an e-cigarette for only five minutes had an impact on pulmonary function comparable to those seen when smoking tobacco for similar duration.[33] Additionally, e-cigarette liquid caused inflammation in airway epithelial cells and increased susceptibility to infection in mouse models.[34] The most considerable risks known at this point surround nicotine and its highly addictive qualities, as well as its known adverse health effects.[1]

E-cigarettes have had several positive outcomes which may counterbalance some negative qualities just mentioned, such as helping to reduce the number of cigarettes needed per day, ease withdrawal symptoms, and reduced cravings.[35, 36, 37, 38] In one study, neither active nor passive e-cigarette smoking elicited an immune response, a characteristic of active and passive tobacco smoking.[39] In another study, the vapor produced by smoking e-cigarettes was found to contain toxic chemicals;

however, these were 9-450 times lower than those produced by conventional cigarettes.[40] Keeping these associated benefits and harms in mind, with the added understanding that more information will surface regarding the long-term effects of e-cigarette use, we must weigh these risks against those associated with continued use of tobacco products. The harms associated with cigarette smoking are well documented and extensive.[1] Each passing year used to study e-cigarettes and determine if they produce deleterious effects is another year where the cigarette smoking prevalence likely remains at its current level. This will cause millions of people to die from cigarette-related illnesses and billions of dollars to be spent on tobacco-related healthcare.[1] With outcomes of this magnitude projected under current conditions, the choice seems clear: we cannot continue on the present path.

E-cigarettes are gaining popularity, and the government needs to investigate how (or whether) to best employ them as a legitimate cessation tool. The major problem with e-cigarettes presently on the market is that they are unregulated. The FDA uncovered the presence of toxic chemicals, known tobacco carcinogens, and levels of nicotine delivery inconsistent with package labeling.[41] An additional issue with e-cigarettes is the risk associated with being exposed to the liquid that contains the nicotine, either through ingestion, inhalation, or absorption through the skin or eyes. Currently, the products are not required to be childproof and are produced with candy and fruit flavors that are enticing to children. The most commonly reported symptoms following exposure, according to a study from the CDC examining poison control center data, were nausea, vomiting, and eye irritation. Although poison centers receive more calls about cigarette exposures than e-cigarettes, e-cigarette exposures were more likely to have reported an adverse event resulting from contact.[42] The study combined e-cigarette and traditional cigarette call data and compared the proportion of calls to poison centers concerning e-cigarettes. Poison center call volume has increased from just 0.3% of calls pertaining to e-cigarettes observed in September 2010 to 41.7% in February 2014.[42] These increases in poisonings related to e-cigarettes are a public health concern and should be addressed before campaigning to use the product as a cessation tool. With proper product regulation of the ingredients contained in electronic cigarettes, as well as improving the safety of

the device to decrease the opportunity for poisoning exposures, this could be a safe, effective transition as individuals attempt to quit smoking.

Regardless of how the reduction in tobacco prevalence is addressed, it is recommended that PA commit to a regular ATS schedule in order to track, and ultimately implement and evaluate policies to improve the public health of the state. A gap of eight years is too much time to wait when funding specifically designated for tobacco control is received every year as part of the tobacco Master Settlement Agreement (MSA). The CDC offers guidelines for how much money should be used in surveillance and prevention programs for each state. PA is below 10% of the CDC recommendation for spending on tobacco prevention programs.[43] Originally, all of the funding from the MSA was intended to ease states' burden of caring for individuals with tobacco-related illness by funding research, healthcare assistance, and prevention/control programs.[44] PA lawmakers have since reallocated portions of the funding through temporary fiscal code changes to areas they feel need more attention.[44] However, allowing ineffective, publicly funded programs to carry on for years without measuring their outcomes places policymakers in a position where they are unable to determine the effectiveness of programs and make appropriate resource allocation decisions. The ATS is needed to not only find areas where health efforts can be improved, but also to hold the current intervention programs accountable.

This report has several strengths and limitations. The strengths are that the survey was a large sample (n=4,434), it had a relatively high response rate for a phone survey (41%), reliability estimates were acceptable for almost all requested statistics, data were weighted to nearly the exact population estimates requested, and extensive data were collected on attitudes, beliefs, and behaviors for each participant.

The limitations of this report are, first, it relies on respondent recall and self-reporting for all data which can bias responses in different directions depending on the question. People are not always likely to accurately report responses requiring recall of historical events, such as if they have smoked 100 cigarettes in their lifetime, if they have been to see a healthcare professional in the past 12 months, or if they have used a certain product in the past 30 days. It is also probable that respondents will underreport

tobacco usage because of social stigma. Second, even with a relatively high response rate of 41% for a phone survey, there is still a risk of nonresponse bias even after adjustment. Similar to the issue of nonresponse is the issue of small sample sizes for certain questions in the survey due to small numbers in a specific demographic reached (e.g. sexual orientations and race/ethnicities). Adjustments cannot be made reliably when there are too few responses. Lastly, comparability between this and other surveys is limited because of how certain items were defined, and because a modified weighting and post-stratification technique different from the standard method was employed. Some of the other surveys used different definitions of current usage for tobacco products. The ATS uses a conservative estimate which most likely provides an overestimate. The altered methodology was adapted due to restricted data access and time constraints.

Tobacco surveillance is key to accomplishing many public health goals. It identifies trends, uncovers at-risk populations, and evaluates program effectiveness. While it can be expensive to conduct a well-designed telephone survey, it is still cheaper than continuously funding ineffective programs. Investing in tobacco awareness campaigns that will change societal norms and acceptance now will offer significant public health benefits in the future.

Any tobacco prevalence above zero, from a public health perspective, is an opportunity to intervene. Examining PA's lack of progress toward the HP2020 goals using data from the 2013 ATS, in comparison with BRFSS data from 2012 and 2011, conveys a need for stronger interventions. Changing social norms, especially when facing counter-pressure from tobacco companies working in opposition, takes time. Surveillance is the key to understanding what programs are effective (and ineffective) in the battle against tobacco use. Tobacco surveillance is essential and needs to be made a high public health priority.

APPENDIX: TABLES

Table 1. Percentage of Pennsylvanians ≥18 years old who met certain criteria for classification as current users of any tobacco product, cigarettes, smokeless tobacco, and snus by select demographics—Pennsylvania Adult Tobacco Survey 2013

		Any tobacco product*		Cigarettes†		Smokeless tobacco§		Snus‡	
	Demographics	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)
Overall	All Adults	27.6	25.6-29.5	22.8	21.0-24.6	3.4	2.6-4.3	0.6	0.2-1.0
Sex	Male	38.4	35.3-41.5	26.5	23.6-29.4	6.6	5.2-8.0	1.0	0.4-1.6
	Female	22.4	20.0-24.8	19.2	16.9-21.4	0.2	0.0-0.4	0.0	0.0-0.1
Race	White, non-Hispanic	28.6	26.6-30.7	21.1	19.2-23.0	3.5	2.8-4.3	0.4	0.1-0.7
	Black, non-Hispanic	39.2	31.8-46.6	31.8	24.7-38.8	0.0	0.0-0.0	0.0	0.0-0.0
	Hispanic	____¶		____¶		____¶		____¶	
	Other race	29.6	19.5-39.6	19.5	11.2-27.9	2.5	0.0-5.9	1.2	0.0-3.6
Age Group (years)	18-24	43.5	36.1-51.0	25.8	19.0-32.6	7.3	4.3-10.4	1.9	0.3-3.4
	25-34	42.3	36.5-48.2	33.8	28.1-39.5	5.3	2.7-8.0	0.9	0.0-2.1
	35-44	31.9	26.6-37.1	25.1	20.3-29.9	3.1	1.4-4.8	0.7	0.0-1.5
	45-54	33.1	28.3-37.9	26.3	21.8-30.9	3.5	1.9-5.1	0.1	0.0-0.3
	55-64	26.1	22.3-30.0	21.0	17.3-24.6	1.7	0.8-2.5	0.0	0.0-0.0
	65+	13.9	11.6-16.3	10.7	8.6-12.8	0.7	0.2-1.2	0.0	0.0-0.0
Education	<HS	44.6	38.3-50.9	38.7	32.5-45.0	5.4	2.4-8.4	1.2	0.0-2.7
	HS or GED	35.7	31.6-39.8	28.2	24.3-32.1	5.0	3.1-7.0	0.5	0.0-1.3
	Some college	30.5	26.6-34.4	26.6	22.8-30.4	1.3	0.5-2.0	0.2	0.0-0.5
	College degree+	16.6	13.8-19.4	10.3	8.0-12.7	1.5	0.8-2.3	0.0	0.0-0.0
Marital Status	Married	21.4	18.9-23.9	14.5	12.4-16.6	2.4	1.6-3.3	0.4	0.0-0.8
	Divorced	39.5	33.6-45.4	35.6	29.8-41.5	2.8	1.0-4.6	0.0	0.0-0.0
	Widowed	17.0	12.5-21.5	14.2	9.9-18.5	1.5	0.1-2.8	0.0	0.0-0.0
	Single	41.5	36.7-46.3	30.1	25.5-34.7	5.7	3.6-7.9	0.9	0.1-1.8
	Living with a partner	48.5	41.1-56.0	41.2	33.7-48.6	3.9	1.4-6.4	0.9	0.0-2.2
	Separated	____¶		____¶		0.9	0.0-2.7	0.0	0.0-0.0
Annual Household Income	<$20,000	45.4	39.3-51.4	39.1	33.0-45.1	5.5	2.9-8.0	1.5	0.0-3.1
	$20,000-$29,999	36.6	29.5-43.7	32.7	25.7-39.7	2.9	0.4-5.4	0.0	0.0-0.0
	$30,000-$49,999	37.5	31.5-43.4	29.9	24.3-35.5	2.5	0.8-4.2	0.0	0.0-0.0

Table 1. (Continued)

	$50,000-$69,999	33.8	28.1-39.4	25.5	20.3-30.6	3.8	1.7-6.0	0.3	0.0-0.8
	$70,000-$99,999	30.2	24.8-35.7	20.0	15.3-24.7	3.6	1.6-5.5	0.8	0.0-2.0
	$100,000-$149,999	25.4	20.0-30.7	20.0	14.9-25.1	2.5	0.7-4.4	0.0	0.0-0.0
	$150,000+	18.6	13.4-23.7	9.5	5.8-13.3	3.0	1.1-4.9	0.6	0.0-1.4
Health District¶¶	Northwest	36.6	29.7-43.5	30.5	23.7-37.2	6.4	3.2-9.7	0.9	0.0-2.1
	Southwest	29.5	24.0-35.0	20.2	15.3-25.1	5.9	3.3-8.5	1.5	0.0-3.1
	Northcentral	29.0	20.5-37.5	23.1	15.0-31.1	5.0	1.0-9.1	0.0	0.0-0.0
	Southcentral	31.3	25.9-36.8	23.2	18.3-28.2	3.5	1.7-5.3	0.3	0.0-0.8
	Northeast	31.0	25.2-36.7	25.6	20.2-31.0	3.1	0.9-5.3	0.0	0.0-0.0
	Southeast	26.7	22.8-30.6	19.7	16.1-23.3	2.2	1.0-3.4	0.4	0.0-1.1
	Allegheny	25.3	19.6-31.0	18.8	13.8-23.9	1.5	0.3-2.7	0.0	0.0-0.0
	Philadelphia	41.9	35.2-48.7	29.1	22.8-35.4	1.5	0.1-2.8	0.0	0.0-0.0
General Health	Excellent	23.2	18.6-27.8	13.3	9.7-16.9	3.0	1.5-4.5	0.0	0.0-0.0
	Very good	27.6	24.2-31.0	19.2	16.2-22.2	2.6	1.6-3.6	0.5	0.0-1.0
	Good	34.2	30.6-37.9	26.6	23.1-30.0	4.5	2.9-6.1	0.8	0.1-1.6
	Fair	38.2	32.2-44.1	33.4	27.5-39.3	2.5	1.0-4.0	0.3	0.0-0.9
	Poor	33.7	25.3-42.1	30.4	22.0-38.7	3.9	0.6-7.2	0.9	0.0-2.6

Abbreviations: CI = Confidence Interval; HS = High School; GED = General Education Development certificate

* Met criteria for current use of any tobacco products

¶ Percentage not statistically reliable.

† Reported smoking at least 100 cigarettes in their lifetime and now smoked "every day" or "some days."

§ Reported having ever tried chewing tobacco, snuff, or dip and using it on one or more days during the 30 days preceding survey interview.

‡ Reported having ever tried snus and using it on one or more days during the 30 days preceding survey interview.

** Reported having ever tried smoking an electronic cigarette and using it on one or more days during the 30 days preceding survey interview.

†† Reported having ever tried smoking cigars, cigarillos, or very small cigars that look like cigarettes and using it on one or more days during the 30 days preceding survey interview.

§§ Reported having ever tried smoking from a regular pipe and smoking it on one or more days during the 30 days preceding survey interview.

‡‡ Reported having ever tried smoking from a water pipe or hookah and smoking it on one or more days during the 30 days preceding survey interview.

¶¶ Northwest: Cameron, Clarion, Clearfield, Crawford, Elk, Erie, Forest, Jefferson, Lawrence, McKean, Mercer, Venango, and Warren. Southwest: Allegheny (separated into own distinct region for analysis), Armstrong, Beaver, Cambria, Fayette, Greene, Indiana, Somerset, Washington, Westmoreland. Northcentral: Bradford, Centre, Clinton, Columbia, Lycoming, Montour, Northumberland, Potter, Snyder, Sullivan, Tioga, and Union. Southcentral: Adams, Bedford, Blair, Cumberland, Dauphin, Franklin, Fulton, Huntingdon, Juniata, Lebanon, Mifflin, Perry, and York. Northeast: Carbon, Lackawanna, Lehigh, Luzerne, Monroe, Northampton, Pike, Susquehanna, Wayne, and Wyoming. Southeast: Berks, Bucks, Chester, Delaware, Lancaster, Montgomery, Philadelphia (separated into own distinct region for analysis), and Schuylkill.

Table 2. Percentage of Pennsylvanians ≥18 years old who met certain criteria for classification as current users of electronic cigarettes, cigars, regular pipes, and water pipes/hookahs by select demographics—Pennsylvania Adult Tobacco Survey 2013

		Electronic Cigarettes**		Cigars††		Regular Pipe§§		Water pipe/Hookah‡‡	
	Demographics	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)
Overall	All Adults	6.1	5.0-7.3	5.2	4.1-6.4	1.0	0.5-1.5	1.2	0.7-1.7
Sex	Male	5.5	4.1-7.0	8.4	6.7-10.1	1.5	0.7-2.2	2.3	1.5-3.2
	Female	4.3	3.2-5.4	1.9	1.2-2.6	0.1	0.0-0.1	0.6	0.2-1.1
Race	White, non-Hispanic	4.2	3.4-5.1	3.8	3.1-4.6	0.6	0.3-0.9	1.1	0.7-1.6
	Black, non-Hispanic	7.0	3.3-10.6	11.7	6.6-16.8	1.6	0.0-4.1	1.0	0.0-2.4
	Hispanic	15.9	6.3-25.5	8.4	1.1-15.8	0.0	0.0-0.0	5.4	0.1-10.6
	Other race	5.0	0.0-10.2	5.8	1.3-10.4	1.2	0.0-3.6	2.8	0.0-6.3
Age Group (years)	18-24	8.0	4.4-11.6	14.0	9.5-18.5	1.6	0.1-3.2	6.8	3.7-9.9
	25-34	9.6	6.3-13.0	6.6	4.0-9.2	0.3	0.0-0.8	2.9	1.3-4.6
	35-44	5.3	2.9-7.7	4.0	1.7-6.3	0.1	0.0-0.4	0.3	0.0-0.8
	45-54	3.9	2.3-5.5	3.3	1.5-5.1	1.2	0.0-2.8	0.1	0.0-0.3
	55-64	3.6	2.0-5.1	3.2	1.9-4.6	0.6	0.1-1.2	0.3	0.0-0.7
	65+	1.3	0.7-1.9	1.7	0.9-2.5	0.6	0.1-1.0	0.0	0.0-0.0
Education	<HS	8.3	4.4-12.3	9.1	4.8-13.5	2.4	0.0-5.1	1.0	0.0-2.3
	HS or GED	7.1	4.8-9.5	3.3	1.8-4.9	0.7	0.1-1.4	0.7	0.0-1.4
	Some college	4.1	2.7-5.6	2.6	1.5-3.7	0.1	0.0-0.3	0.5	0.0-1.1
	College degree+	2.1	1.1-3.0	3.0	1.9-4.2	0.2	0.0-0.4	0.6	0.1-1.0
Marital Status	Married	3.1	2.1-4.1	2.7	1.9-3.6	0.3	0.0-0.6	0.6	0.2-0.9
	Divorced	5.3	2.9-7.6	4.7	2.2-7.2	0.5	0.0-1.2	0.2	0.0-0.5
	Widowed	2.2	0.2-4.3	1.3	0.0-2.6	1.0	0.2-1.8	0.0	0.0-0.0
	Single	7.4	4.9-9.8	10.3	7.4-13.1	1.1	0.2-1.9	4.1	2.3-5.8
	Living with a partner	9.9	5.9-13.9	7.0	2.8-11.3	2.5	0.0-5.6	2.0	0.0-4.1
	Separated	12.5	3.3-21.7	7.7	0.3-15.1	0.6	0.0-1.7	0.9	0.0-2.7
Annual Household Income	<$20,000	8.9	5.6-12.3	6.3	3.6-9.0	1.6	0.3-2.9	4.0	1.6-6.5
	$20,000-$29,999	6.5	3.1-9.9	6.4	2.2-10.7	2.0	0.0-5.2	1.8	0.0-4.3
	$30,000-$49,999	8.3	5.0-11.6	7.2	4.0-10.5	0.9	0.0-1.9	1.7	0.2-3.2
	$50,000-$69,999	5.3	2.4-8.2	6.3	3.6-9.0	0.2	0.0-0.5	1.5	0.1-2.8
	$70,000-$99,999	4.6	2.5-6.7	3.7	1.7-5.8	0.7	0.0-1.6	1.5	0.1-3.0
	$100,000-$149,999	3.6	1.4-5.8	3.2	1.1-5.4	0.1	0.0-0.2	1.0	0.0-2.2
	$150,000+	1.8	0.4-3.1	2.9	0.8-4.9	0.5	0.0-1.3	0.6	0.0-1.4
Health District¶¶	Northwest	4.9	1.9-7.9	4.7	2.1-7.3	0.0	0.0-0.0	2.5	0.5-4.5
	Southwest	4.5	2.5-6.5	4.5	2.0-6.9	0.7	0.0-1.9	0.4	0.0-1.0
	Northcentral	1.0	0.0-2.4	3.3	0.6-6.0	1.2	0.0-3.0	1.5	0.0-3.3
	Southcentral	5.7	3.0-8.3	3.8	1.4-6.2	2.0	0.0-4.1	0.6	0.0-1.3

Table 2. (Continued)

	Northeast	6.7	3.4-9.9	5.7	2.5-8.8	0.7	0.0-1.4	1.1	0.0-2.1
	Southeast	4.2	2.6-5.9	4.4	2.8-6.0	0.2	0.0-0.4	1.4	0.4-2.3
	Allegheny	4.9	2.5-7.3	4.2	1.8-6.6	0.8	0.0-1.6	0.9	0.0-1.9
	Philadelphia	6.9	3.2-10.5	10.4	6.3-14.5	0.6	0.0-1.2	4.6	1.6-7.6
General	Excellent	2.6	0.8-4.3	4.5	2.5-6.4	0.6	0.0-1.1	2.1	0.7-3.5
Health	Very good	4.0	2.6-5.4	5.0	3.5-6.5	0.4	0.0-0.8	1.2	0.4-1.9
	Good	6.5	4.7-8.4	5.6	3.7-7.5	1.1	0.2-2.0	1.6	0.6-2.5
	Fair	6.1	3.6-8.7	4.3	2.3-6.4	0.9	0.0-2.2	1.1	0.0-2.1
	Poor	8.3	3.4-13.1	5.3	1.6-9.1	1.2	0.0-2.7	1.6	0.0-3.7

Abbreviations: CI = Confidence Interval; HS = High School; GED = General Education Development certificate

* Met criteria for current use of any tobacco products.

† Reported smoking at least 100 cigarettes in their lifetime and now smoked "every day" or "some days."

§ Reported having ever tried chewing tobacco, snuff, or dip and using it on one or more days during the 30 days preceding survey interview.

‡ Reported having ever tried snus and using it on one or more days during the 30 days preceding survey interview.

** Reported having ever tried smoking an electronic cigarette and using it on one or more days during the 30 days preceding survey interview.

†† Reported having ever tried smoking cigars, cigarillos, or very small cigars that look like cigarettes and using it on one or more days during the 30 days preceding survey interview.

§§ Reported having ever tried smoking from a regular pipe and smoking it on one or more days during the 30 days preceding survey interview.

‡‡ Reported having ever tried smoking from a water pipe or hookah and smoking it on one or more days during the 30 days preceding survey interview.

¶¶ Northwest: Cameron, Clarion, Clearfield, Crawford, Elk, Erie, Forest, Jefferson, Lawrence, McKean, Mercer, Venango, and Warren. Southwest: Allegheny (separated into own distinct region for analysis), Armstrong, Beaver, Cambria, Fayette, Greene, Indiana, Somerset, Washington, Westmoreland. Northcentral: Bradford, Centre, Clinton, Columbia, Lycoming, Montour, Northumberland, Potter, Snyder, Sullivan, Tioga, and Union. Southcentral: Adams, Bedford, Blair, Cumberland, Dauphin, Franklin, Fulton, Huntingdon, Juniata, Lebanon, Mifflin, Perry, and York. Northeast: Carbon, Lackawanna, Lehigh, Luzerne, Monroe, Northampton, Pike, Susquehanna, Wayne, and Wyoming. Southeast: Berks, Bucks, Chester, Delaware, Lancaster, Montgomery, Philadelphia (separated into own distinct region for analysis), and Schuylkill.

Table 3. Percentage of Pennsylvanians ≥18 in select Healthy People 2020 tobacco categories from 2008-2013

Objective	2020 Goal	PA 2013*	PA 2012^	PA 2011^	PA 2010	PA 2009	PA 2008
% of adults who smoke cigarettes	12.0	22.8±2	23±1	23±1	18±1	21±1	22±1
% of adults who use smokeless tobacco	0.3	3.4±1	4±1	NA	NA	3±1	4±1
% of adults who smoke cigars	0.2	5.2±1	DNC	DNC	NA	4±1	DNC
% of adult smokers who attempted to quit	80.0	61.6±5	59±2	59±3	55±3	57±3	59±3

Source: Pennsylvania Department of Health Bureau of Health Statistics and Research;
Selected data from Healthy People 2020 progress report using BRFSS data.[45]
Abbreviations: DNC = Data not collected; NA = Not applicable
^BRFSS weighting and sampling methodology changed in 2011; Comparisons between years after the change and prior to the change are not reliable.
95% confidence intervals are given after "±"
*PA ATS 2013 data

APPENDIX: FIGURES

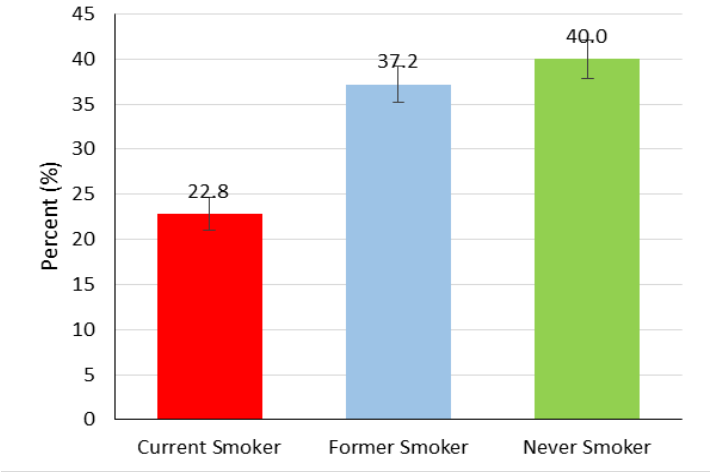


Figure 1. Percentage of Pennsylvanians ≥18 years old by Smoking Status—Pennsylvania Adult Tobacco Survey 2013

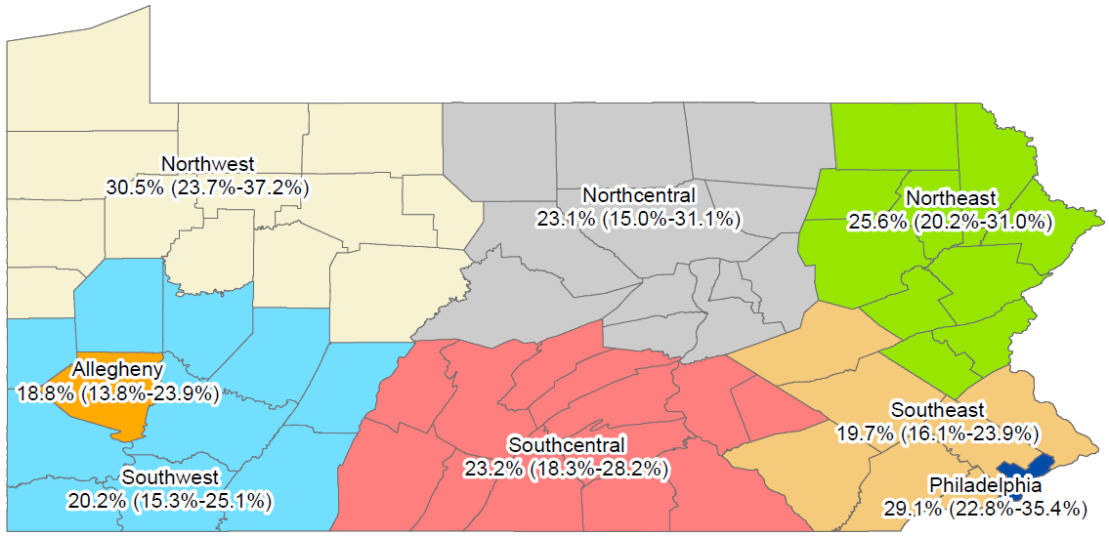
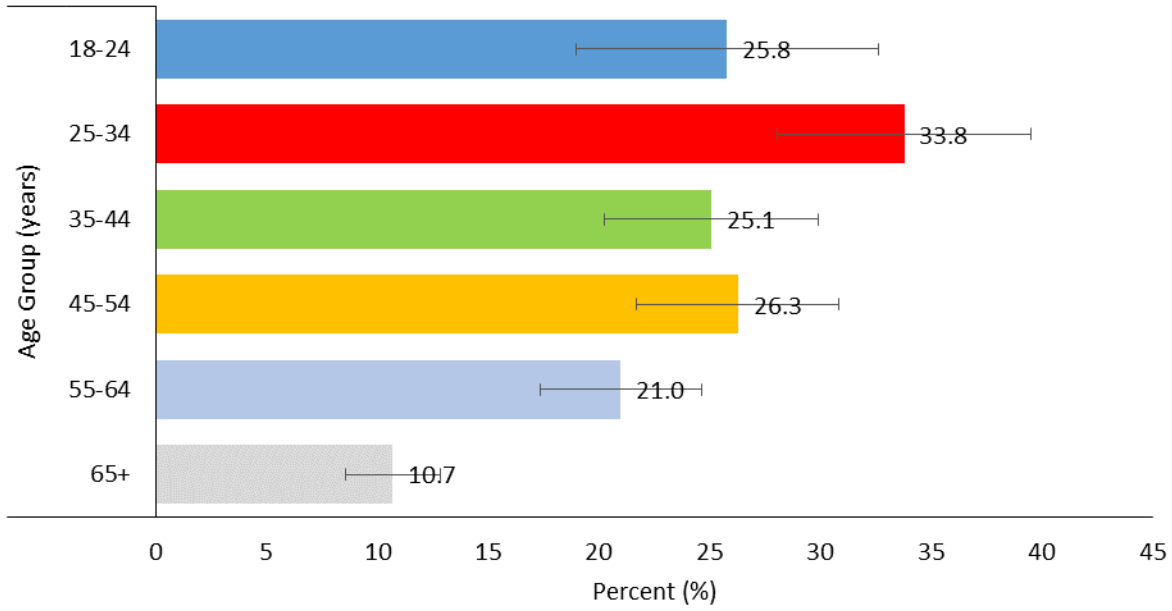


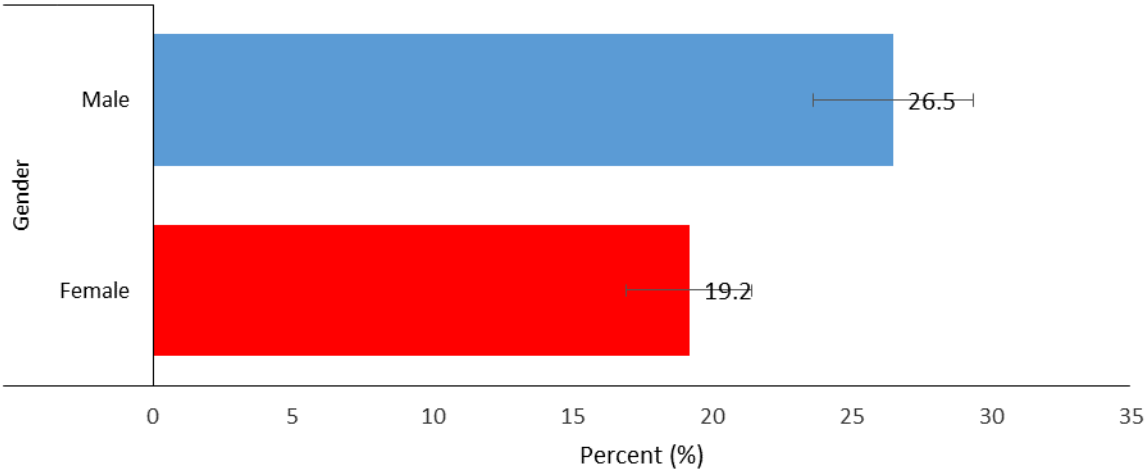
Figure 2. Percentage of Pennsylvanians ≥18 years old who reported current cigarette smoking† by health district—Pennsylvania Adult Tobacco Survey 2013



† Reported smoking at least 100 lifetime cigarettes and smoking every day or some days.

Source: ATS, 2013

Figure 3. Percentage of Pennsylvanians ≥18 years old who reported current cigarette smoking† by age category—Pennsylvania Adult Tobacco Survey 2013



† Reported smoking at least 100 lifetime cigarettes and smoking every day or some days.

Source: ATS, 2013

Figure 4. Percentage of Pennsylvanians ≥18 years old who reported current cigarette smoking† by sex—Pennsylvania Adult Tobacco Survey 2013

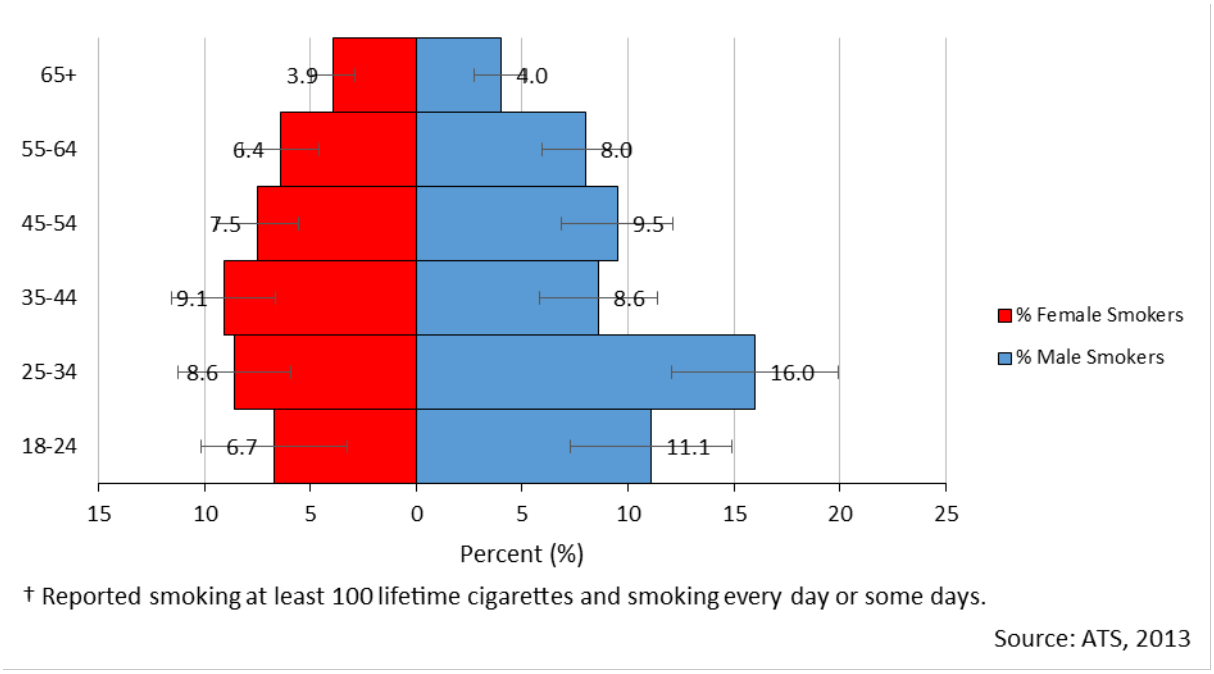


Figure 5. Percentage of Pennsylvanians ≥18 years old who reported current cigarette smoking† by age/sex—Pennsylvania Adult Tobacco Survey 2013

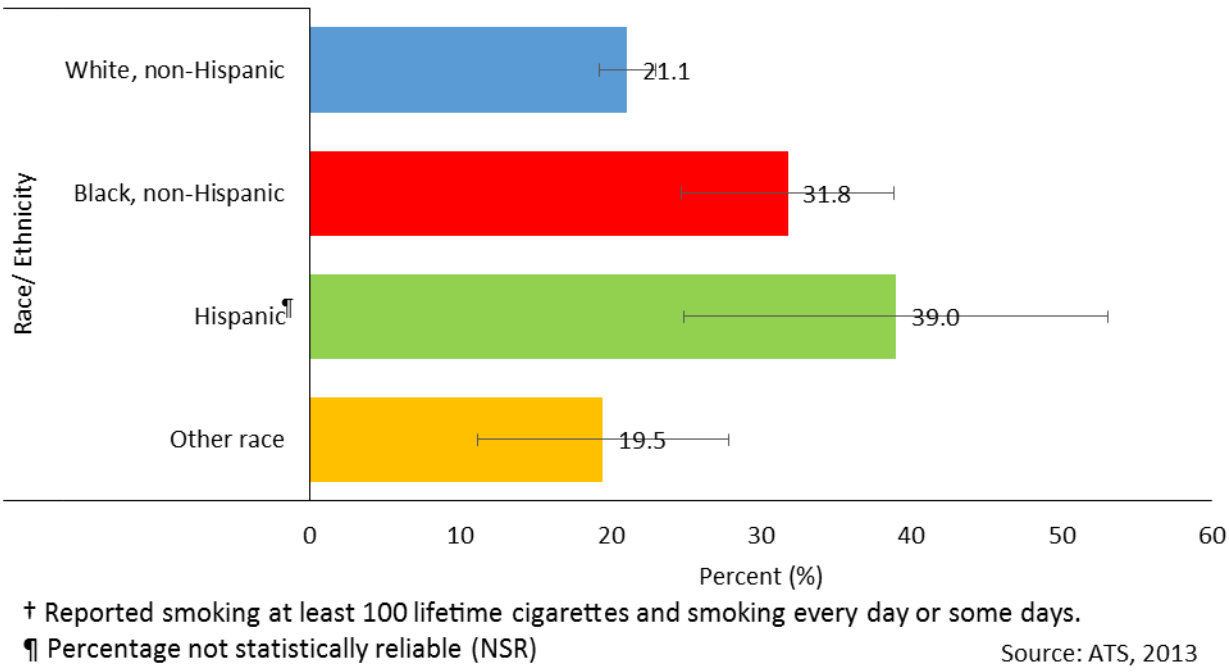
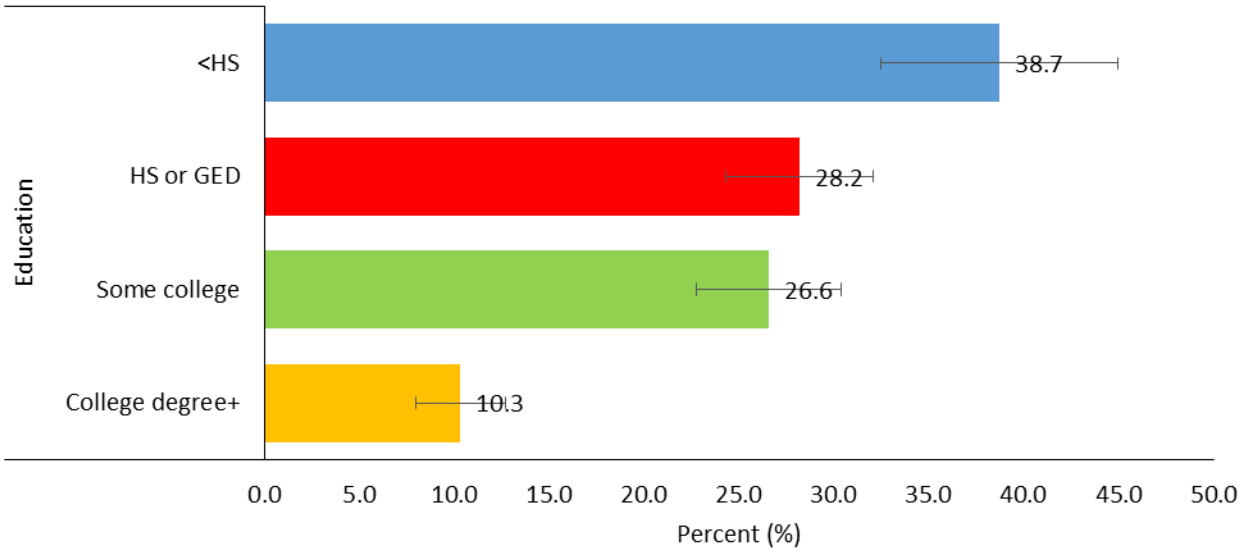


Figure 6. Percentage of Pennsylvanians ≥18 years old who reported current cigarette smoking† by race/ethnicity—Pennsylvania Adult Tobacco Survey 2013

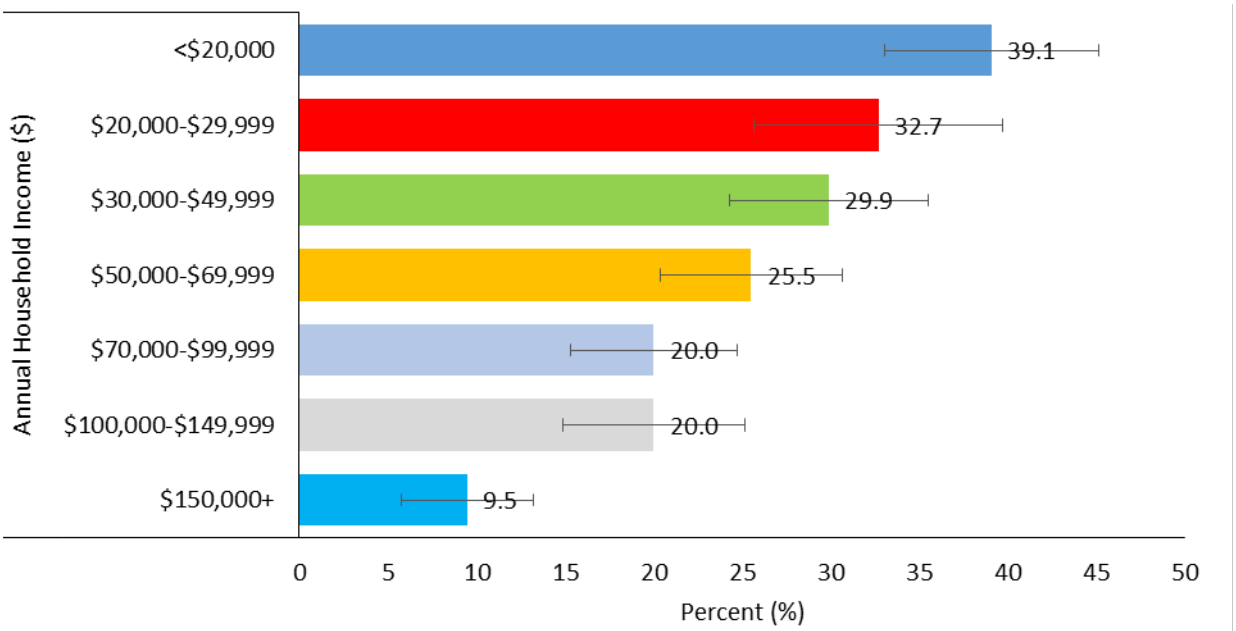


Abbreviations: HS = High School; GED = General Education Development certificate

† Reported smoking at least 100 lifetime cigarettes and smoking every day or some days.

Source: ATS, 2013

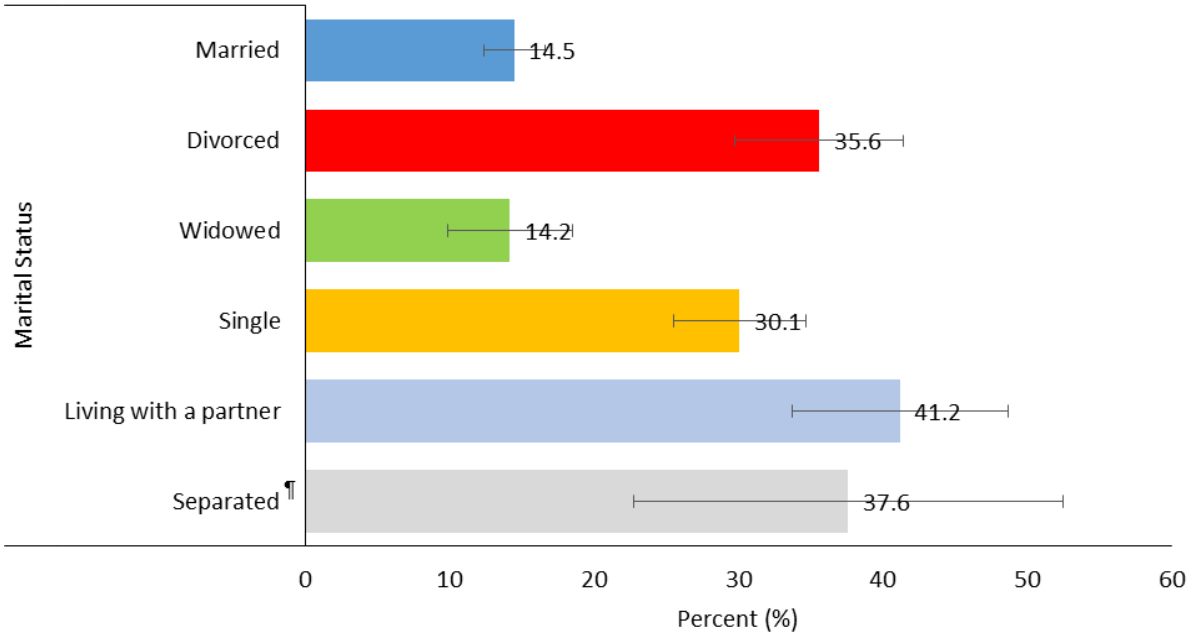
Figure 7. Percentage of Pennsylvanians ≥25 years old who reported current cigarette smoking† by education level—Pennsylvania Adult Tobacco Survey 2013



† Reported smoking at least 100 lifetime cigarettes and smoking every day or some days.

Source: ATS, 2013

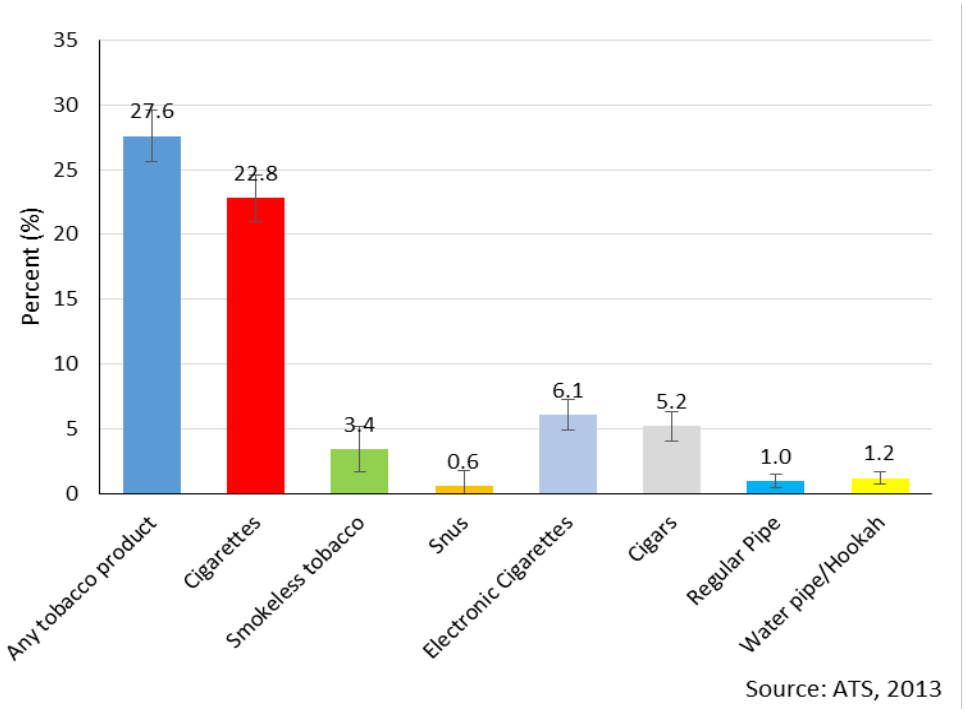
Figure 8. Percentage of Pennsylvanians ≥18 years old who reported current cigarette smoking† by household income—Pennsylvania Adult Tobacco Survey 2013



† Reported smoking at least 100 lifetime cigarettes and smoking every day or some days.
¶ Percentage not statistically reliable (NSR)

Source: ATS, 2013

Figure 9. Percentage of Pennsylvanians ≥18 years old who reported current cigarette smoking† by marital status—Pennsylvania Adult Tobacco Survey 2013



Source: ATS, 2013

Figure 10. Percentage of Pennsylvanians ≥18 years old who reported current use of a tobacco product by product type—Pennsylvania Adult Tobacco Survey 2013

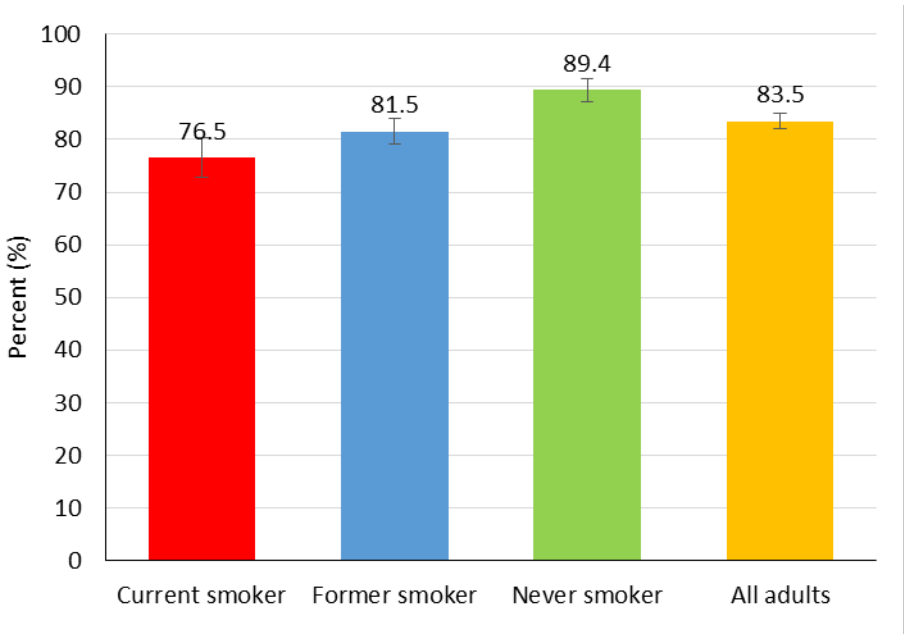


Figure 11. Percentage of Pennsylvanians ≥18 years old self-reporting general health of "good", "very good", or "excellent" by smoking status—Pennsylvania Adult Tobacco Survey 2013

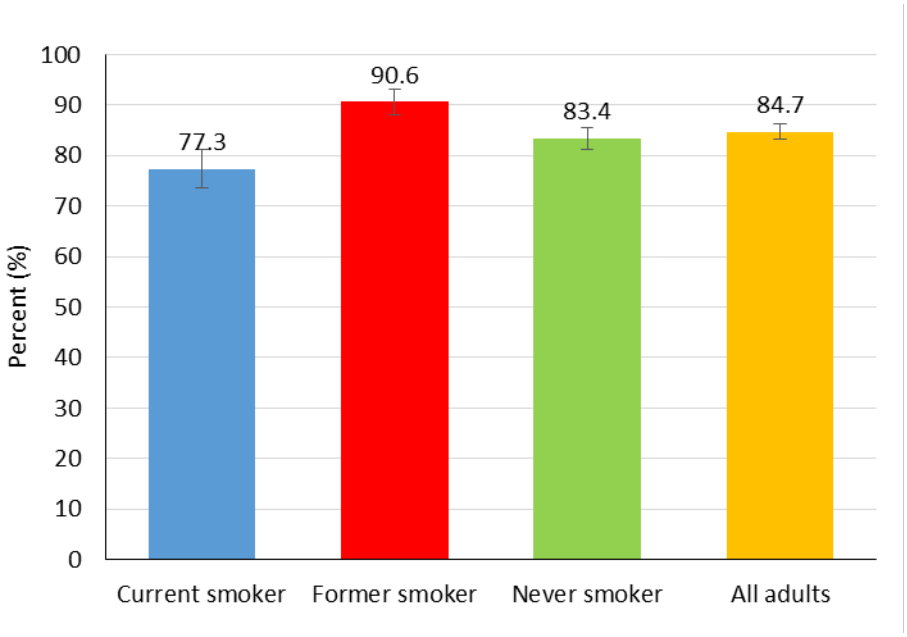


Figure 12. Percentage of Pennsylvanians ≥18 years old who saw a health professional by smoking status—Pennsylvania Adult Tobacco Survey 2013

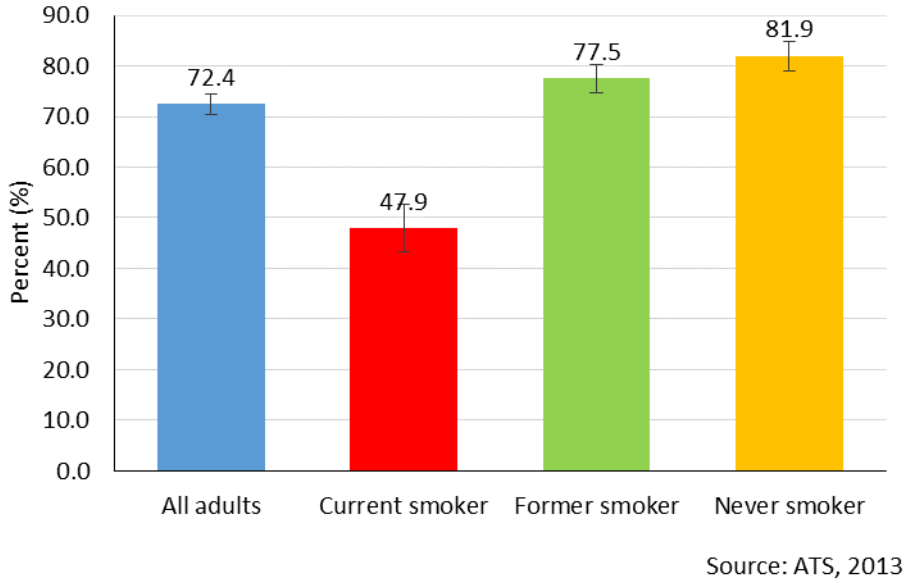


Figure 13. Percentage of Pennsylvanians ≥18 years old in approval of a smokeless tobacco tax by smoking status—Pennsylvania Adult Tobacco Survey 2013

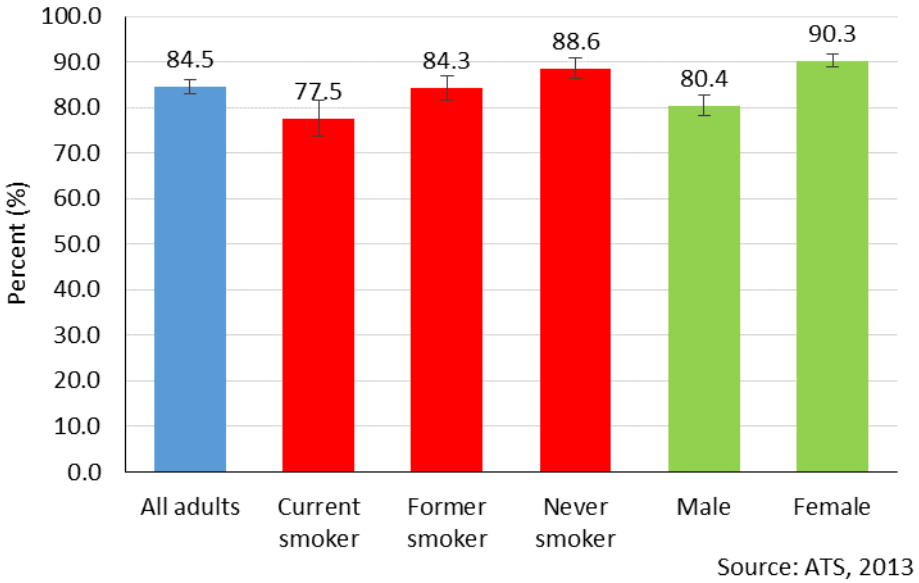


Figure 14. Percentage of Pennsylvanians ≥18 years old who believe it is 'very important' to prevent sales of tobacco products to minors by smoking status and sex—Pennsylvania Adult Tobacco Survey 2013

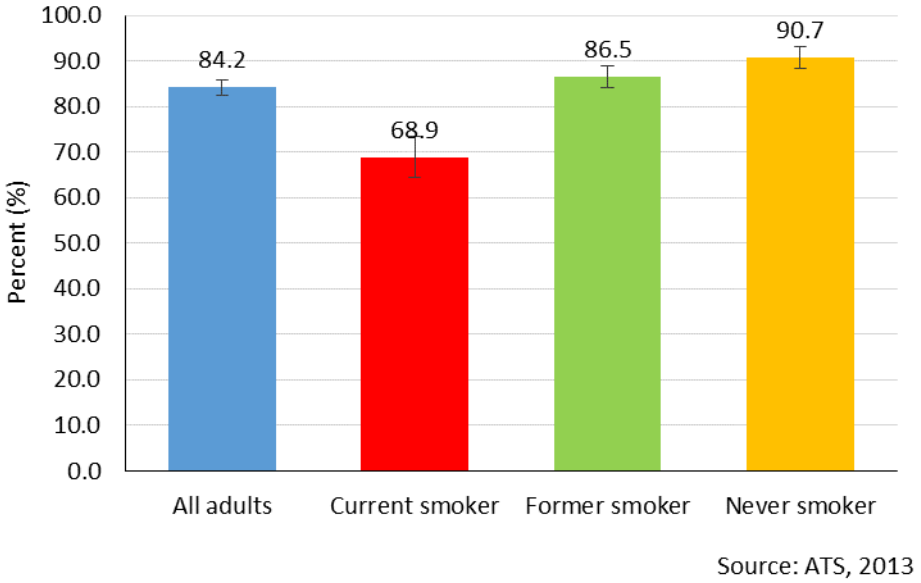


Figure 15. Percentage of Pennsylvanians ≥18 years old in favor of completely banning tobacco on all school grounds, even for teachers, by smoking status—Pennsylvania Adult Tobacco Survey 2013

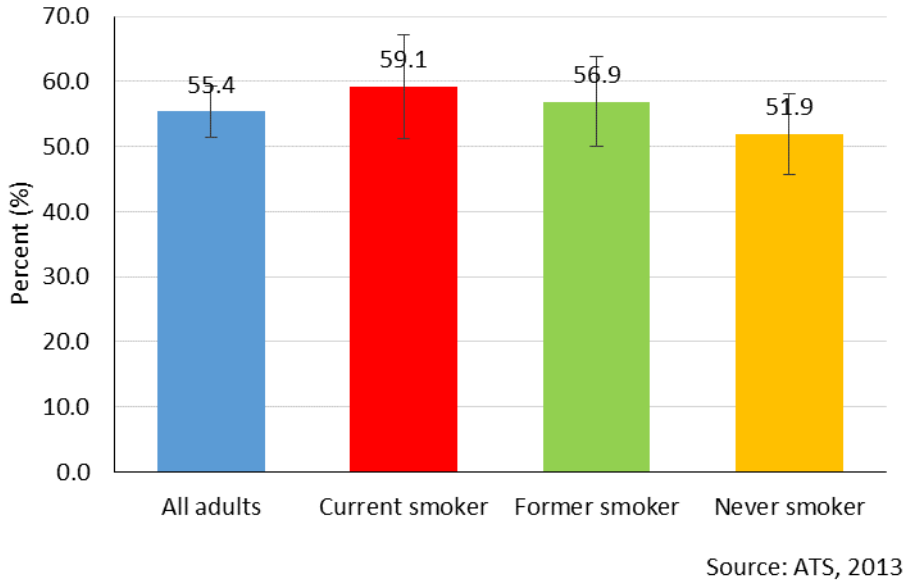


Figure 16. Percentage of Pennsylvanians ≥18 years old currently parenting any children aged 17 or younger who believe it is 'very important' or 'somewhat important' to talk to these children about not using tobacco, by smoking status—Pennsylvania Adult Tobacco Survey 2013

BIBLIOGRAPHY

[1] National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health. (2013). The health consequences of smoking—50 years of progress: a report of the surgeon general. Centers for Disease Control and Prevention (US).

[2] Danaei, G., Ding, E., Mozaffarian, D., Taylor, B., Rehm, J., Murray, C., & Ezzati, M. (2009). The preventable causes of death in the United States: comparative risk assessment of dietary, lifestyle, and metabolic risk factors. PLoS Medicine, 6(4). doi:10.1371/journal.pmed.1000058

[3] Bartecchi, C. E., MacKenzie, T. D., & Schrier, R. W. (1994). The human costs of tobacco use (1). The New England journal of medicine, 330(13), 907–12. doi:10.1056/NEJM199403313301307

[4] Boffetta, P, Hecht, S, Gray, N, Gupta, P, & Straif, K. (2008). Smokeless tobacco and cancer. Retrieved from http://www.sciencedirect.com/science/article/pii/S147020

[5] Single, E, Robson, L, & Rehm, J. (1999). Morbidity and mortality attributable to alcohol, tobacco, and illicit drug use in Canada. Retrieved from http://ajph.aphapublications.org/doi/abs/10.2105/AJPH.89.3.385

[6] Shapiro, JA, Jacobs, EJ, & Thun, MJ. (2000). Cigar smoking in men and risk of death from tobacco-related cancers. Retrieved from http://jnci.oxfordjournals.org/content/92/4/333.short

[7] Thun, M., Carter, B., Feskanich, D., Freedman, N., Prentice, R., Lopez, A., … Gapstur, S. (2013). 50-Year trends in smoking-related mortality in the United States. The New England Journal of Medicine. doi:10.1056/NEJMsa1211127

[8] Critchley, J., & Unal, B. (2003). Health effects associated with smokeless tobacco: a systematic review. Thorax, 58(5), 435–443. doi:10.1136/thorax.58.5.435

[9] Henley, S., Thun, M., Chao, A., & Calle, E. (2004). Association between exclusive pipe smoking and mortality from cancer and other diseases. Journal of the National Cancer Institute, 96(11), 853–861. doi:10.1093/jnci/djh144

[10] Akl, E., Gaddam, S., Gunukula, S., Honeine, R., Jaoude, P., & Irani, J. (2010). The effects of waterpipe tobacco smoking on health outcomes: a systematic review. International Journal of Epidemiology, 39(3), 834–857. doi:10.1093/ije/dyq002

[11] Jha, P., Ramasundarahettige, C., Landsman, V., Rostron, B., Thun, M., Anderson, R., … Peto, R. (2013). 21st-century hazards of smoking and benefits of cessation in the United States. The New England Journal of Medicine. doi:10.1056/NEJMsa1211128

[12] Centers for Disease Control and Prevention. Best practices for comprehensive tobacco control programs — 2014. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2014.

[13] Barnoya, J., & Glantz, S. (2005). Cardiovascular effects of secondhand smoke nearly as large as smoking. Circulation, 111(20), 2684–2698. doi:10.1161/CIRCULATIONAHA.104.492215

[14] Max, W., Sung, H.-Y., & Shi, Y. (2012). Deaths from secondhand smoke exposure in the United States: economic implications. American Journal of Public Health, 102(11), 21732180. doi:10.2105/AJPH.2012.300805

[15] Pierce, J. P., Fiore, M. C., Novotny, T. E., Hatziandreu, E. J., & Davis, R. M. (1989). Trends in cigarette smoking in the United States. Educational differences are increasing. JAMA, 261(1), 56–60.

[16] Sonnenfeld, N., Schappert, S., & Lin, S. (2009). Racial and ethnic differences in delivery of tobacco-cessation services. American journal of preventive medicine, 36(1), 21–8. doi:10.1016/j.amepre.2008.09.028

[17] Adler, N., & Newman, K. (2002). Socioeconomic disparities in health: pathways and policies. Health Affairs, 21(2), 60–76. doi:10.1377/hlthaff.21.2.60

[18] Barbeau, E. M., Krieger, N., & Soobader, M.-J. J. (2004). Working class matters: socioeconomic disadvantage, race/ethnicity, gender, and smoking in NHIS 2000. American journal of public health, 94(2), 269–78.

[19] U.S. Department of Health and Human Services. (1998). Tobacco Use Among U.S. Racial/Ethnic Minority Groups—African Americans, American Indians and Alaska Natives, Asian Americans and Pacific Islanders, and Hispanics: A Report of the Surgeon General. Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health.

[20] The Coalition for Tobacco Free Kids. (2014). The toll of tobacco in Pennsylvania. Available at [http://www.tobaccofreekids.org/facts_issues/toll_us/Pennsylvania]. Accessed [11/6/2014].

[21] Zhang, X, Miller, L, Max, W, & Rice, DP. (1999). Cost of smoking to the Medicare program, 1993. Available at [https://www.cms.gov/Research-Statistics-Data-and-Systems/Research/HealthCareFinancingReview/downloads/99summerpg179.pdf].

[22] Taylor, D.H., et al., Benefits of smoking cessation for longevity. American journal of public health, 2002. 92(6): p. 990-996.

[23] McClave, A., Dube, S., Strine, T., & Mokdad, A. (2009). Associations between health-related quality of life and smoking status among a large sample of U.S. adults. Preventive medicine, 48(2), 173–9. doi:10.1016/j.ypmed.2008.11.012

[24] Tillmann, M, & Silcock, J. (1997). A comparison of smokers’ and ex-smokers' health-related quality of life. Retrieved from http://jpubhealth.oxfordjournals.org/content/19/3/268.short

[25] Mulder, I., Tijhuis, M., Smit, H., & Kromhout, D. (2001). Smoking cessation and quality of life: the effect of amount of smoking and time since quitting. Preventive Medicine, 33(6), 653660. doi:10.1006/pmed.2001.0941

[26] U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. About Healthy People. Washington, DC. Available at [http://www.healthypeople.gov/2020/About-Healthy-People]. Accessed [11/20/2014].

[27] U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. Healthy People 2020. Washington, DC. Available at [http://www.healthypeople.gov/2020/topics-objectives/topic/tobacco-use/objectives]. Accessed [11/20/2014].

[28] Bureau of Health Statistics and Research Division of Tobacco Prevention and Control (2005). 2005 Pennsylvania Adult Tobacco Survey report. Available at [http://www.portal.state.pa.us/portal/server.pt?open=514&objID=598866&mode=2]. Accessed [9/13/2014].

[29] Centers for Disease Control and Prevention. (2013). Behavioral Risk Factor Surveillance System: Weighting the Data (2011 Weighting Formula). Available at [http://www.cdc.gov/brfss/annual_data/2011/2011_weighting.htm]. Accessed [11/20/2014].

[30] Centers for Disease Control and Prevention. (2012). Guidelines for Conducting General Population State Adult Tobacco Telephone Surveys. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health

[31] Agaku, IT, King, BA, Husten, CG, Bunnell, R, Ambrose, BK, Hu, SS, Holder-Hayes, E, and Day, HR. (2014). Tobacco product use among adults – United States, 2012-2013. MMWR. Morbidity and Mortality Weekly Reports, 63(25), 542-547.

[32] Centers for Disease Control and Prevention. (2013). Behavioral Risk Factor Surveillance System prevalence and trends data, 2012. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health. Available at [http://apps.nccd.cdc.gov/brfss/list.asp?cat=TU&yr=2012&qkey=8161&state=All]. Accessed on [11/11/2014].

[33] Vardavas, C., Anagnostopoulos, N., Kougias, M., Evangelopoulou, V., Connolly, G., & Behrakis, P. (2012). Short-term pulmonary effects of using an electronic cigarette: impact on respiratory flow resistance, impedance, and exhaled nitric oxide. Chest, 141(6), 1400–6. doi:10.1378/chest.11-2443

[34] Wu, Q., Jiang, D., Minor, M., & Chu, H. (2014). Electronic Cigarette Liquid Increases Inflammation and Virus Infection in Primary Human Airway Epithelial Cells. PLoS ONE, 9(9). doi:10.1371/journal.pone.0108342

[35] Caponnetto, P., Russo, C., Bruno, C. M., Alamo, A., Amaradio, M. D., & Polosa, R. (2013). Electronic cigarette: a possible substitute for cigarette dependence. Monaldi archives for chest disease = Archivio Monaldi per le malattie del torace / Fondazione clinica del lavoro, IRCCS [and] Istituto di clinica tisiologica e malattie apparato respiratorio, Università di Napoli, Secondo ateneo, 79(1), 12–9.

[36] Dawkins, L., Turner, J., Hasna, S., & Soar, K. (2012). The electronic-cigarette: effects on desire to smoke, withdrawal symptoms and cognition. Addictive behaviors, 37(8), 970–3. doi:10.1016/j.addbeh.2012.03.004.

[37] Caponnetto, P., Campagna, D., Cibella, F., Morjaria, J., Caruso, M., Russo, C., & Polosa, R. (2013). EffiCiency and Safety of an eLectronic cigAreTte (ECLAT) as Tobacco Cigarettes Substitute: A

Prospective 12-Month Randomized Control Design Study. PLoS ONE, 8(6). doi:10.1371/journal.pone.0066317

[38] Polosa, R., Morjaria, J., Caponnetto, P., Campagna, D., Russo, C., Alamo, A., … Fisichella, A. (2014). Effectiveness and tolerability of electronic cigarette in real-life: a 24-month prospective observational study. Internal and emergency medicine, 9(5), 537–46. doi:10.1007/s11739-013-0977-z.

[39] Flouris, A.D., Poulianiti, K.P., Chorti, M.S., Jamurtas, A.Z., Kouretas, D., Owolabi, E.O., … Koutedakis, Y. (2012). Acute effects of electronic and tobacco cigarette smoking on complete blood count. Food and chemical toxicology : an international journal published for the British Industrial Biological Research Association, 50(10), 3600–3. doi:10.1016/j.fct.2012.07.025

[40] Goniewicz M.L., Knysak J., Gawron M., Kosmider L., Sobczak A., Kurek J., Prokopowicz A., Jablonska-Czapla M., Rosik-Dulewska C., Havel C., Jacob III P., and Benowitz N. (2014). Levels of selected carcinogens and toxicants in vapour from electronic cigarettes. Tobacco Control, 2014. 23:133-139 doi:10.1136/tobaccocontrol-2012-050859.

[41] FDA. (2014). Summary of results: laboratory analysis of electronic cigarettes conducted by FDA. US Department of Health and Human Services. Available at: [http://www.fda.gov/NewsEvents/PublicHealthFocus/ucm173146.htm]. Accessed on: [12/3/2014].

[42] Chatham-Stephens, K., Law, R., Taylor, E., Melstrom, P., Bunnell, R., Wang, B., Apelberg, B., Schier, J.G. (2014). Notes from the Field: Calls to Poison Centers for Exposures to Electronic Cigarettes — United States, September 2010–February 2014. MMWR. Morbidity and Mortality Weekly Reports, 63(13), 292-293. Available at: [http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6313a4.htm?s_cid=mm6313a4_w]. Accessed on: [12/5/2014].

[43] Campaign for Tobacco-Free Kids. (2014). Broken promises to our children: the 1998 state tobacco settlement 15 years later. Available at [http://www.tobaccofreekids.org/what_we_do/state_local/tobacco_settlement/]. Accessed on [11/11/2014].

[44] American Lung Association. (2014). State of tobacco control 2014, highlights: Pennsylvania. Available at: [http://www.stateoftobaccocontrol.org/state-grades/pennsylvania/highlights.html] Accessed on: [12/4/2014]

[45] Pennsylvania Department of Health, Bureau of Health Statistics and Research. Healthy People 2020. Available at [http://www.portal.state.pa.us/portal/server.pt/community/health_statistics/14136/healthy_people/590079]. Accessed on [11/20/2014].